

MARINE REVIEW.

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No. 21.

A Very Liberal Business Transaction.

As many harsh things are being said about men of wealth in these days, it may not be out of place to refer to a private transaction between John D. Rockefeller and the ship building firm of F. W. Wheeler & Co., West Bay City, Mich., who have just completed three big steel vessels for the Bessemer Steamship Co., which is the corporation operating Mr. Rockefeller's ships on the lakes. It is well known that there was a clear understanding with all of the ship builders who undertook to furnish vessels for the Bessemer fleet within a specified time, that a premium would be paid for advance delivery and that demurrage would be charged for delays. Both premium and demurrage were fixed by stated figures covering each day of advance delivery or delay in delivery, and when the vessels were finished settlements were made on this basis. In the case of Wheeler & Co. the completion of the vessels was very much behind time. Without going into details, it is sufficient to say that Mr. Rockefeller's representatives had in their hands a claim for demurrage against the West Bay City firm aggregating nearly \$40,000. Part of this might have been offset by counter claims, based mainly on labor troubles at the ship yard, but it is understood that a strict adjustment of the matter, with other settlements and legal precedent to follow, would have resulted in very little reduction for the builders. Still Mr. Wheeler and his associates had given to Mr. Rockefeller three of the best ships that had ever been built on the lakes. Nothing was spared to make them complete in every particular and to satisfy every desire of the men who were to manage and sail them. This was in reality the only counter claim presented to offset the demurrage account. There was a moral obligation involved. The matter was presented to Mr. Rockefeller's representatives in New York, and their answer was to deal with Mr. Wheeler in accordance with the spirit that had characterized his work, making him feel that he was not to be the loser on account of a liberal policy in furnishing good ships. The big demurrage claim was entirely wiped out.

Dimensions for Welland Canal Ships.

It has been said that the new Rhodes steamers, to be built at South Chicago, are expected to carry 2,800 net tons on 14 feet draft through the Welland canal. If this estimate is realized the owners will certainly have reason to congratulate the builders. The largest load of any kind ever carried by a steamer through the Welland was a cargo of 75,000 bushels of wheat, moved this season by the steamer Aragon, which was built by the Detroit Dry Dock Co. and is owned by C. R. Jones and others of Cleveland. This is equal to only 2,250 net tons. About 150 tons might be added on account of the Aragon's draft being limited somewhat by wooden sheathing. It must be noted also that the vessel was drawing only 13½ feet, and builders can not figure on full 14 feet in the Welland, as a draft of about 13½ feet has been the rule during the past season. Notwithstanding the claim that a vessel 260 feet over all can be worked through the locks of the Welland, owners of the Aragon say that anyone attempting to build a boat larger than their steamer for canal traffic is taking chances of breaking gates and encountering considerable annoyance otherwise. The Aragon's exact dimensions are 238 feet keel, 253 feet 6 inches over all, 42 feet beam and 17 feet moulded depth. Although the difference between keel length and over all length just noted in this steamer is 15 feet 6 inches, it is well known that she is straight up and down at the stern.

Another big passenger steamer for the Old Dominion Line, operating between Richmond, Norfolk and New York, will be built at Roach's ship yard, Chester, Pa. The contract has just been let. The steamer will be 320 feet long and 45 feet beam, much like the Jamestown and Yorktown in construction and appearance but a trifle larger. When this new boat is in commission in connection with the Jamestown and Yorktown the Old Dominion company will have three of the finest passenger steamers on the Atlantic coast. The contract calls for completion Aug. 1, 1897.

New Vessels—Ship Yard Matters.

It is announced that F. W. Wheeler & Co. will build for O. W. Blodgett of Bay City a steel steamer of Welland canal size. The boat will be 254 feet over all, 42 feet beam and 23 feet depth. James Corrigan of Cleveland is figuring with the steel builders for a tow barge of the largest type now afloat, and it is understood also that the Cleveland Ship Building Co. has about completed arrangements for the construction of another 400-foot steamer. But aside from these negotiations, which are not of a settled kind, the several builders on the lakes have made positive arrangements for the construction of eleven ships—six steamers and five consorts—as follows:

Chicago Ship Building Co., South Chicago, Ill.—One steel freight steamer of 400-foot type, to be equipped with quadruple engines and Babcock & Wilcox water tube boilers, for A. B. Wolvin of Duluth; two steel steamers, Welland canal size, of about 2,700 net tons capacity, for Robert R. Rhodes of Cleveland; one steel tow barge, largest lake size, for C. W. Elphicke and others, Chicago.

Cleveland Ship Building Co.—Steel steamer of 400-foot type for Capt. Thomas Wilson of Cleveland.

Globe Iron Works Co., Cleveland—Steel tow barge of largest lake size for Bessemer Steamship Co., Cleveland.

F. W. Wheeler & Co., West Bay City, Mich.—Steel steamer of Welland canal size to cost about \$120,000 for O. W. Blodgett, Bay City.

Capt. James Davidson, West Bay City, Mich.—Wooden steamer, single deck, of 210 feet keel and 41 feet beam; two wooden tow barges, 300 feet long, 45 feet beam and 24 feet moulded depth.

Union Dry Dock Co., Buffalo—Steel oil tank barge for Standard Oil Co.

As two of the steamers of the Bessemer company's fleet, one built by the Cleveland Ship Building Co. and the other by Wheeler & Co., are not in commission, the management will probably not give out any figures tending to show the relative merits of vessels built at different ship yards. It is understood, however, that Mr. Duncan Frazer, chief engineer of the company, proposes to make careful tests of each of the steamers as soon as his duties will admit of time being given to this kind of work. The two steamers built by the Globe company, Bessemer and Siemens, are high powered and have been making wonderful time. The Bessemer has made 14 miles an hour light, and has been towing one of the big barges, the Nasmyth, right along at an average speed better than 11½ miles. This is not a speed report of the passenger boat kind. It is actual time taken from trip sheets.

Capt. McLeod of Buffalo, who is a very good judge of ships of all kinds, has been inspecting, for the underwriters, the steel car ferry Pere Marquette, building at the yard of F. W. Wheeler & Co., West Bay City, for the F. & P. M. Ry. Co., and he says she is the finest vessel of her kind ever built in this country. Wheeler & Co. look for a second contract as a result of excellent work on this vessel, and everybody on the lakes who has had any dealings with them is hoping that their expectations will be realized.

The steel tow barge for which the Chicago Ship Building Co. closed a contract a few days ago with C. W. Elphicke and others of Chicago, will be a duplicate of the Corrigan barge Aurania, with the addition of towing machine and sails; in fact it may be noted that all of the later barges built by the Chicago company are of this same size, differing only in minor details of arrangements.

Milwaukee's new fire boat, the August F. Janssen, has been delivered, without machinery, by her builders, Rieboldt & Wolter of Sturgeon Bay, Wis. Boiler and engines are now being placed in the boat at Milwaukee by the Milwaukee Boiler Co. and the Elmes Engine Co. of Chicago.

Work has been progressing rapidly of late on the big oil barge for lake service, which is being built at the works of the Union Dry Dock Co., Buffalo, for the Standard Oil Co. The vessel is now about three-fourths plated.

Receipts of ore at South Chicago to Nov. 1 footed up 1,193,687 gross tons, against 1,634,238 gross tons on the same date in 1895.

Quadruple Engines in a Big Freight Ship.

Mr. W. I. Babcock of the Chicago Ship Building Co. informs the Review that the steamer *Crescent City*, now under way at Chicago, and which is to be a steel freight ship of the largest type afloat on the lakes, will be equipped with quadruple expansion engines and Babcock & Wilcox boilers furnishing steam at 250 pounds pressure. Cylinders of the engines are to be 19, 28, 41 and 60 inches diameter and the stroke 42 inches. This steamer is building for A. B. Wolvin of Duluth, who already has two big freight carriers, the *Queen City* and *Zenith City*, fitted with Babcock & Wilcox water tube boilers, but having triple expansion engines. It is expected that greater efficiency will be attained with the quadruple engines working in connection with water tube boilers. The engines are to be built by the Chicago company, which has begun the work of getting tools together for the construction of engines. Patterns for the engines are nearly finished, and it is expected that they will be ready so that the ship can go into commission early in the spring.

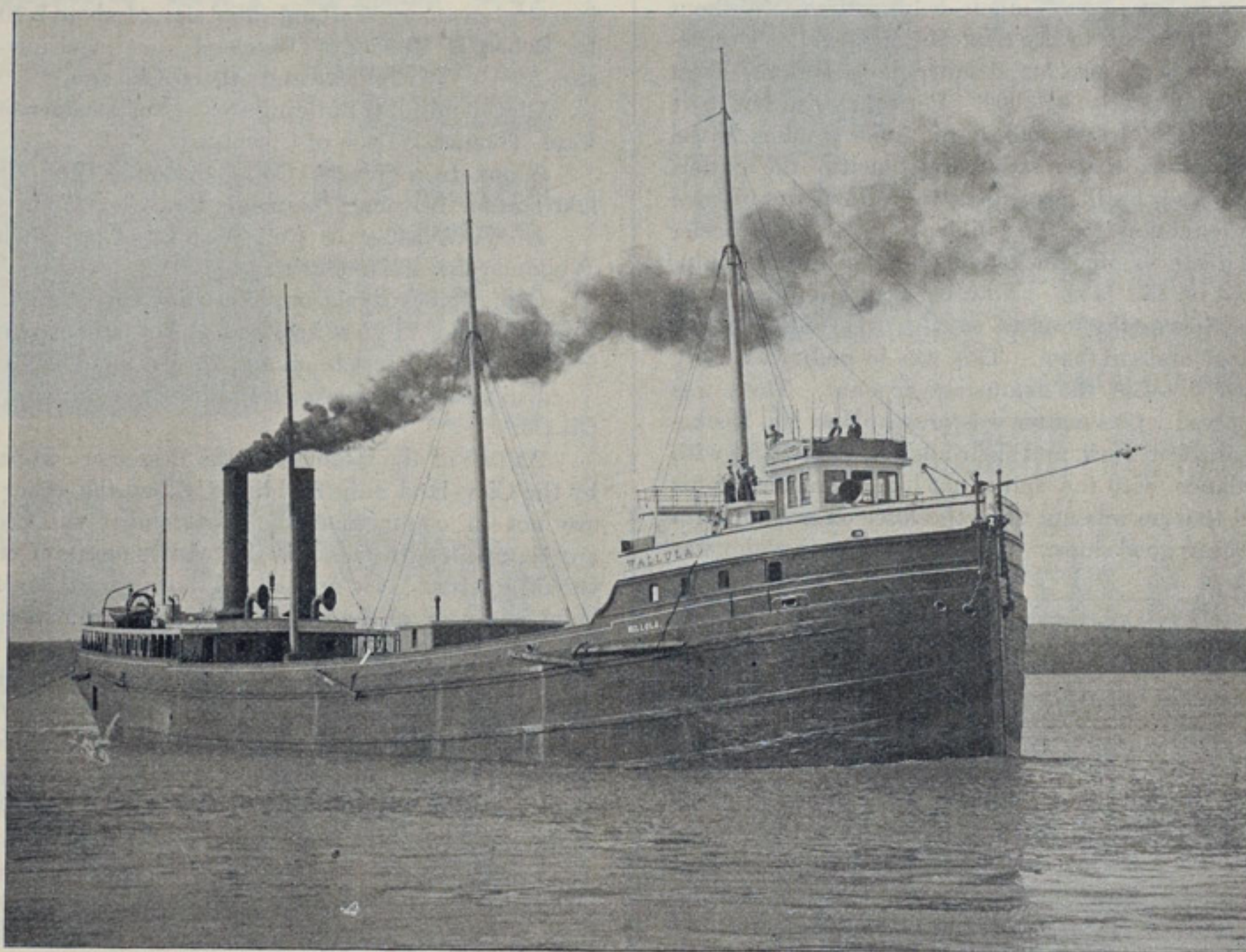
Lights, Fog Signals, Etc.

About Nov. 20 the south light at the east entrance and the west light at the north entrance to Sand Beach harbor of refuge, west side

the insurance companies, and provision made to remove these wrecks, they will probably be destroyed by order of the Dominion government. Under directions of the war department a wreck in this same vicinity, that of the schooner *Macy*, which is in American water, is being removed.

An Experimental Vessel.

Editor Marine Review:—Now that ship building companies on the lakes are resorting to the best practice in engineering to produce economical freight carriers, and are getting down to tests to prove by actual coal consumption and other data the value of systems of artificial draft, etc., it may be expected that vessel owners will in the future get more for the money invested in new ships than they have in the past. But I notice that in some of the claims made as to consumption of fuel per horse power per hour there is not the proper regard for a statement of facts regarding conditions under which low figures are shown. For instance, in the case of the *Inchmona*, an English vessel, it is stated that she attained the remarkably economical result of one indicated horse power per hour for one pound of coal. This progress has been enormous, but it is rash to assume, as some have done, that because the *Inchmona* has achieved on trial the unique feat of getting



STEAMER WALLULA—WRECKED AND DAMAGED BY FIRE AT CONNEAUT, O.

of Lake Huron, will be changed, each from a tubular lantern to a lens lantern, to increase their range of visibility. Each light will illuminate 270 degrees of the horizon, and will be visible from all points of approach from both the lake and the harbor, excepting that the southerly light at the easterly entrance to the harbor will not be visible to the westward of N. 13 degrees W., nor to the southward of N. 77 degrees E.; and the westerly light at the northerly entrance will not be visible to the northward of N. 55 degrees E., nor to the westward of S. 35 degrees E.

The steam fog horn at Pelee spit, Lake Erie, has been repaired and is again in operation.

A spar buoy now marks the spot on Southeast shoal, Lake Erie, where the gas buoy with stationary light was located. The "blinker," which was on Pelee middle ground, has also been removed.

Mr. George Gott, collector of customs at Amherstburg, Ont., has been asked by the Lake Carriers' Association to call the attention of the Canadian marine department to wrecks of the steamers *Cottrell* and *Grand Traverse* and the schooner *Adams*, all of which are sunk near the mouth of the Detroit river, and which are regarded as obstructions to navigation. Unless objection is raised by the owners or

unit of power for unit of coal, the same results are to become common in marine engineering practice in the immediate future. It must be admitted that the *Inchmona* is an experimental vessel, as several extremes in engineering are noted in descriptions of the ship published in this country.

Engineer.

Chicago, Nov. 17, 1896.

Capt. Howard Patterson, author of a large number of works on navigation, and principal of the New York Nautical College, has begun the publication of a magazine that will be known as the *New York Nautical College Quarterly*. The publication is evidently in the interest of the school. The first number contains a selection of short sailor yarns that are not original but quite interesting.

The Cleveland Ship Building Co. will build a new Scotch boiler for the steamer *Robert Wallace*, to be put in during the winter. This boiler will replace a fire-box boiler.

If we did not get your boat in the list of sixty which we had photographed in the Detroit river, we can get a picture of her if she passes the Sault in daylight.

In General.

A Philadelphia dispatch credits the seagoing battleship Iowa with a speed of 16.27 knots on her builders' trial. Her guaranteed speed was 16 knots an hour, for four hours, and her builders receive \$50,000 for each quarter knot in excess of 16 knots.

It had been intended to transfer Capt. Robley D. Evans, U. S. N., who is now in command of the Indiana, to the light-house board, to relieve Capt. John R. Bartlett, whose term of shore service has expired, but Capt. Evans is desirous of remaining on sea duty and it is probable that his wishes will be consulted in the matter.

During the recent Italian naval maneuvers numerous experiments were made in the employment of carrier pigeons. Eighty of these birds were carried on the two flag ships. The birds were fed two hours before the time of their being let loose, and the messages were written on very thin paper inserted in the barrel of a goosequill closed at both ends, and tied around the pigeon's body. Under favorable conditions the flight of the birds was found to average nearly forty-eight miles an hour.

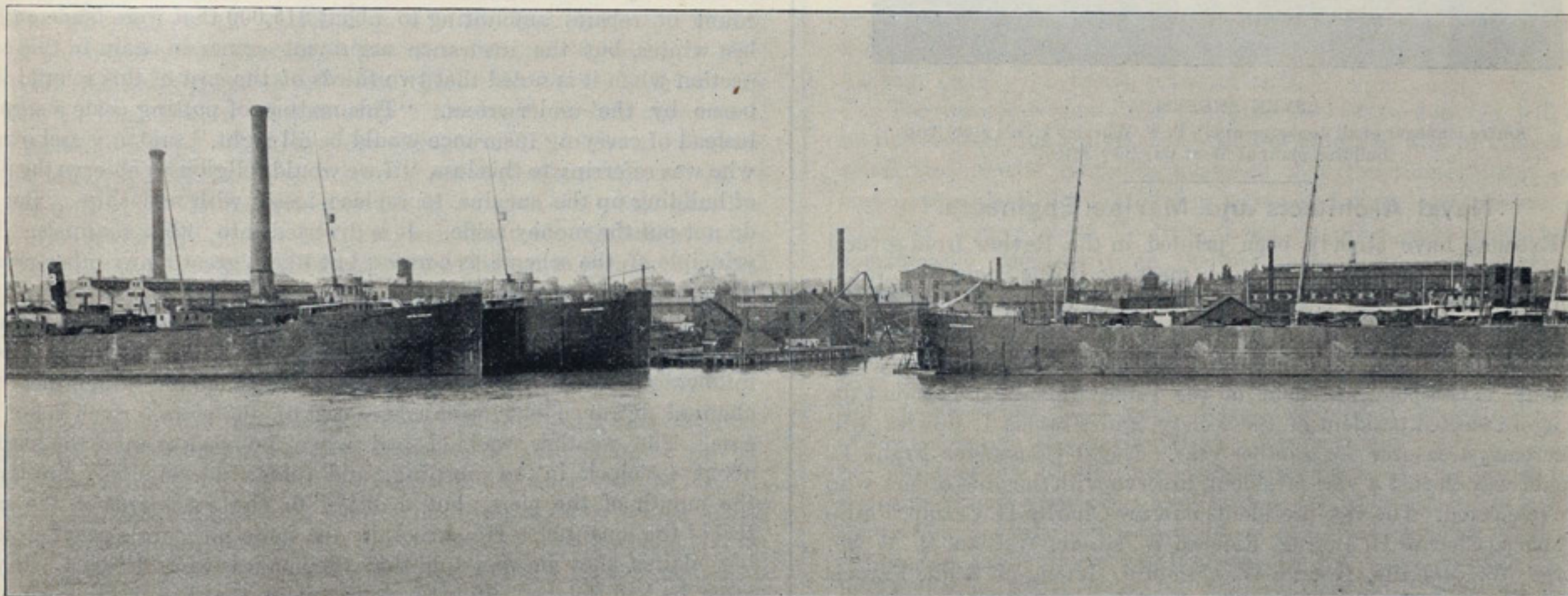
On the Atlantic coast, as well as the lakes, there are reports of more active operations in ship yards. The Harlan & Hollingsworth Co. of Wilmington, Del., has been awarded a contract by the Merchants' & Miners' Steamship Line, for the construction of a steel passenger and freight steamer to ply between Baltimore and New England ports. The new vessel is to be of 3,000 gross tons. She will

Advices from Washington indicate that the revised international rules to prevent collisions at sea, which were formulated by the International Marine Conference, may go into effect on July 1. It appears that the officers of the state and treasury departments have been working to this end since the adjournment of congress, and that Great Britain is co-operating with the United States in securing the assent of the nations which have not as yet formally announced their adhesion to the rules. The nations which have thus far agreed to adopt the rules and enforce them after July 1 are Great Britain, Germany, France, Denmark, Russia, Italy, Portugal, Austria, Belgium, Spain, Hawaii, Japan, Mexico, Guatemala, Chili and Honduras. These nations, with the United States, control 22,000,000 tons, or more than five-sixths of the world's shipping, while the important nations whose assents have not yet been received are Norway, Sweden, the Netherlands, Brazil and Turkey, controlling about 3,000,000 tons of shipping.

Cargo and Speed Records—Lake Freight Steamers.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches. From Lake Superior—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,637 gross or 5,194 net tons, Ashland to Conneaut, draft of 15 feet 9 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 207,000, bushels of corn, equal to 6,210 net tons, Chicago to Buffalo, 16 feet



THREE VESSELS OF THE BESSEMER FLEET AT THE YARD OF THE DETROIT DRY DOCK CO.

be 270 feet long, 42 feet beam and 32 feet depth of hold. A river barge 190 feet long and 34 feet beam, built for the Hartford & New York Transportation Co., was launched a few days ago at Gildersleeve's ship yard, Hartford, Conn.

Until battleship meets battleship to fight to the death, there will continue to be big ships built by one country, and bigger ones by another; some full of small guns, others with a preponderance of large guns; some covered from head to foot in complete armor, others distributing it about in spots; some will steam at high speed, while others will be content to follow more leisurely; some will stow thousands of tons of coal, others will carry only hundreds. Perhaps all these differences are of no real importance, for the untried factor which counts most in enabling a battleship to perform her duty best is "the man behind the gun."—R. Hunt in Engineering Magazine.

If lake vessel owners who are adopting artificial draft in boilers of their steamers, with a view to economy of fuel, etc., are making a mistake, they will at least have the satisfaction of knowing that the big ship owners of England and Germany, who ought to be well posted in such matters, are following the same course. The Cambrian, a freight steamer of 10,000 tons capacity and 4,000 horse power, just launched at the yard of Wm. Gray & Co., West Hartlepool, is to be fitted with the Howden draft, while the Ellis & Eaves system is to be applied, during the winter, at the works of the Vulcan company in Germany to the North German Lloyd liner Saale. The Russian admiralty is also applying the Ellis & Eaves system to two or three naval vessels of that country.

8 inches draft; steamer Maricopa, Minnesota Steamship Co., Cleveland, 191,700 bushels of corn, Chicago to Buffalo; steamer Zenith City, A. B. Wolvin of Duluth, 289,000 bushels of oats, Chicago to Buffalo. From Lake Superior—Steamer Queen City, 66,283 bushels of oats, 50,360 bushels of corn and 95,326 bushels of wheat, equal to 5,328 net tons, Duluth to Buffalo.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour.

California is convenient. Comfort, speed and economy in rates are the distinguishing characteristics of the fast western express leaving Cleveland daily at 10:58 a. m. via the Nickel Plate road, and reaching Chicago at 9:00 p. m. same day, and our night express arriving at Chicago at 7:40 a. m. daily. Direct connections at Chicago with all the leading lines for Los Angeles, San Diego, and San Francisco. Through tickets and baggage checks. Sleeping car space and all details arranged by any agent of the Nickel Plate road. Cleveland city ticket office, 224 Bank street.

380 Nov. 20

A photograph of the largest boat on the lakes, the Sir Henry Bessemer, will cost you only \$1.50. Write the Marine Review.



SVEN ANDERSON,
Active manager of all departments in F. W. Wheeler & Co's steel ship
building plant at West Bay City, Mich.

Naval Architects and Marine Engineers.

Extracts have already been printed in the Review from several of the papers read at the annual meeting of the Society of Naval Architects and Marine Engineers, held in New York during Friday and Saturday of last week. Important parts of other papers will be published later on. The meeting was successful in every way. Clement A. Griscom, president of the International Navigation Co., was again elected president of the society, and Francis T. Bowles will be secretary-treasurer for another year. Naval Constructor Frank L. Fernald was elected a vice-president, to serve with the nine others who were re-elected. The vice-presidents now are Charles H. Cramp, Philip Hichborn, Charles H. Loring, Richard W. Meade, William H. Webb, George W. Melville, George W. Quintard, Irving M. Scott, Francis A. Walker and Frank S. Fernald. In the council W. L. Capps succeeds Frank L. Fernald, W. F. Durand succeeds Calvin B. Orcutt, J. E. Denton succeeds Frank W. Wheeler, and Edward Farmer succeeds J. F. Holloway.

At the banquet, which was held at Delmonico's Friday evening, Secretary of the Navy Herbert was the guest of honor. In concluding an answer to the toast "The United States Navy," he said: "In culture, in capacity, in character, our naval officers of today are not surpassed by any body of men in the world. They represent every congressional district in the union. Winnowed as they are by severe tests applied upon admission to the Naval Academy at every examination there, and afterward, upon rising every grade in the service, the country has every assurance of the moral and intellectual fitness of these officers. Their morale and discipline are admirable. The Naval Academy that keeps the grades full was never in a higher state of efficiency. The War College has developed into an institution which, for instructions in the art of war and the devising of methods for the utilization of all our possible naval resources, has certainly no superior. Our enlisted men, as a body, are being well disciplined and can be implicitly relied on. Let me assure you that whenever and wherever our navy is called upon it will be found on the alert, ready for its work whatever and wherever that work may be. I sincerely hope it will not soon have any battles to fight—it will best serve its purposes if by its size, strength and clearly apparent readiness for service, it shall be able to maintain the rights of our citizens abroad, to aid our diplomacy and to command our peace all around the world without firing a gun, but if it shall at any time come to pass, as come it may, that readiness is not enough, but that a foreign foe must be encountered in actual combat, then I prom-

ise you, on behalf of the officers and men of the navy, that they will do their duty in a manner worthy of all the glorious memories that cluster around the flag of our country."

Loss of the Wallula.

The loss of a vessel like the Wallula, which stranded near Conneaut a few days ago, always causes a discussion of insurance matters, and speculation as to the advisability of owners of big fleets carrying insurance of any kind. Although the Wallula has been released, and will undoubtedly be rebuilt, it is more than probable that she will prove a constructive total loss, and Capt. Thomas Wilson, her owner, will release her to the underwriters and be paid \$70,000, the full insurance, which is entirely right and in accordance with rules governing such matters. Some people will say that Capt. Wilson has profited by the accident, although he may not think so. However this may be, it is quite evident that insurance in his case has turned out well. For six years previous to last year, he carried no insurance on his several vessels and had no serious losses. Last year he lost the Missoula on Lake Superior, and although he did not regard the vessel as fully insured he was fortunate in having her quite well covered, and best of all, her crew of about seventeen men, who had been almost given up as lost, turned up at the Sault after having spent a couple of weeks in the wilderness on the north shore of Lake Superior. The Wallula was in her fifteenth season, and it must be admitted that wooden vessels at such an age begin to lose their value very rapidly. Her owners may have regarded her as worth more than \$70,000, on account of repairs amounting to about \$15,000 that were made on her last winter, but the insurance argument comes in again in this connection when it is noted that two-thirds of the cost of this rebuild was borne by the underwriters. "This matter of putting aside a surplus instead of carrying insurance would be all right," said a vessel owner who was referring to this loss, "if we would religiously observe the plan of building up the surplus, to replace losses with new ships. But we do not put the money aside. It is diverted into other channels. The principle of the scheme is correct, but like a great many other principles, it is never carried out."

In justice to Capt. Holmes of the Wallula it may be well to note that he did not miss the piers at Conneaut. Some of the dispatches following the accident would indicate that he did not get near the channel entrance but went ashore east of the piers. Such is not the case. The weather was not bad when he tried to enter the harbor, about 4 o'clock in the morning, and fetched up on a bar, directly in the mouth of the piers, but a little to the westward of the center of the channel. He struck in the same place on a previous trip, but claims that he was told that the bar was to be dredged. It was after he had fetched up between the piers that bad weather came on and drove his boat ashore, notwithstanding the efforts of the harbor tugs to save her.

First Sign of Recovery in Pig Iron.

With the first of November comes the first sign of recovery from the long period of depression in the pig iron industry. On Nov. 1 the weekly capacity of all furnaces in blast was 124,077 gross tons, against 112,782 gross tons on Oct. 1. For, eight or ten months previous to Nov. 1 production had declined steadily. The course of production this year and last has been in exactly opposite directions. The following table shows the approximate monthly output in each year for the ten months ending with October, stated in round figures. The table presents a striking contrast, and shows very clearly the course of the industry:

Month.	1895.	1896.
January.....	762,500	946,000
February.....	641,500	800,500
March.....	688,000	882,000
April.....	666,500	835,000
May.....	664,500	822,000
June.....	664,500	691,000
July.....	730,000	780,000
August.....	781,009	675,000
September.....	899,500	633,000
October.....	940,500	466,000

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building.

Investigating Lake Methods.

Following the close of the passenger season, a few weeks ago, Capt. Henry Stone of the Northern line steamer North Land, made a trip from Montreal to Cape Breton island and return on one of the steamers of the Dominion Coal Co. of Boston, which are engaged in carrying coal from the port of Sydney on Cape Breton island up the Gulf of St. Lawrence and the lower St. Lawrence river. It is well known, of course, that Canada takes a large amount of this Cape Breton coal, in addition to the immense quantities that go to Boston and other points in the New England states. Sir W. C. Van Horne, president of the Canadian Pacific Railway, is a director of the Dominion Coal Co., and as such he is interesting himself in an effort to reduce carrying charges on the coal that goes up the Gulf of St. Lawrence and the St. Lawrence river, mainly to Montreal. In this trade there is a long stretch of river navigation and it is the intention, if possible, to adopt the lake system of big steamers with equally large consorts. Capt. Stone's trip was made with a view to offering suggestions along this line. The delivery of coal in Montreal from Cape Breton is now costing the company \$1.70 a ton. Capt. Stone says he is quite confident from what he learned on the trip that the towing system can be applied to the service, and the cost of carrying the coal reduced to a figure remarkably low as compared with that now paid. Since his return to Cleveland he has furnished to the parties interested exact figures regarding carrying charges on the lakes, and estimates as to their business. Handling charges in the Cape Breton business are, he says, already low, with no unnecessary delays in port at either end of the route, as the machinery is of the best, some of it having been furnished from Cleveland, but the difficulty is with the kind of boats that are engaged in the work. The steamer on which he made a trip, the Cape Breton, carried only 2,200 tons. Several steamers of the turret deck type, which are also engaged in the trade, are of about 3,500 tons capacity, but even these are not of a kind that would be suited to towing. In order to gain the advantages of the lake practice, it will be necessary, of course, to put into the trade big steel steamers and barges having water ballast capacity sufficient to permit of careful handling. These and other details of lake methods are explained in a report made by Capt. Stone since his return to Cleveland.

Liberal Policy Regarding River and Harbor Work.

By turning the attention of the great producing centers of our country to the necessity for their fostering in every manner the natural thoroughfares of the United States, much good can be done in removing from the minds of our people the prejudice which exists against appropriations for improving our rivers and harbors. With the greatest object lesson in all history afforded by the boundless increase in lake commerce, due almost directly to the wise policy of systematically building up approaches to lake ports, and constantly improving them as the needs of the growing commerce has required, until the fleets of the great lakes are one of the wonders of the world (not only in the number and character of vessels, but in the efficiency and vast uses of the service they perform), it would seem that the clamor of the interior against such appropriations should be turned into a demand for the most liberal policy possible in this matter, as no other expenditure of the federal government can so quickly, surely, and abundantly benefit the food producing sections. The chances for profit are so great in this hitherto unexploited field of freight handling by water on a large scale, that there are sure to be efforts to control and cripple it in that form in which it will be a blessing to the entire country; and concessions of all kinds, to be used for speculative purposes, should be jealously guarded against, and the Erie canal so held as free as the waters of the Hudson.—Lewis Nixon, ship builder of Elizabethport, N. J.

Chicago is just settling down to the understanding that its big sewer, the Chicago drainage canal, is to cost \$50,000,000, instead of \$30,000,000, which was the first estimate. This is not surprising. The estimated cost of the Manchester canal, recently completed, and which is a commercial failure, was \$28,750,000, but before the work was completed the expenditures had reached a total of \$80,000,000. The estimated cost of the Suez canal was \$40,000,000, but the actual cost was \$94,500,000, without counting the work, valued at \$20,000,000, which Egypt did gratuitously.

At Chicago, Tuesday, the old steamer Chief Justice Waite was sold by the United States marshal for \$810.

How Some Owners are Figuring.

In letting a contract to the Chicago Ship Building Co. for two steel steamers of Welland canal size, Mr. Robert R. Rhodes of Cleveland simply figures that he is more liable to secure a fair return on his investment in these two steamers than he would on one large ship of the 400-foot type, which would cost him about as much as the two smaller ones. He is of the opinion that the increase in commerce to and from Lake Ontario has not been attended by the construction of vessels suited to the trade, and he is also looking forward to a better business through the Welland when the St. Lawrence canals will afford 14 feet navigation through to Montreal, about two years hence. Along this same line of argument it is noted also that the big ore companies are getting to a point where they can, with ships of the largest type, care for the greater part of their own ore, and there is competition enough among vessel owners generally for the surplus ore and for the grain trade between Chicago, Duluth and Buffalo; then why is the individual owner not better off in seeking a business in which he will not be compelled to compete with the largest carriers afloat? The steamers for Mr. Rhodes, or rather the Lower Lakes Steamship Co., which is the corporation name under which they will be operated, will each be 240 feet keel, 42 feet beam and 26 feet depth. As the beam is quite large, the owners are figuring on the boats carrying 2,800 net tons on 14 feet draft. The engines, which will be built by the Cleveland Ship Building Co., will have cylinders of 17, 29 and 47 inches diameter with a common stroke of 36 inches. Each vessel will have two Scotch boilers, allowed 170 pounds steam. Gangways will be fitted for package freight, not on account of any railway connections planned for the steamers but with a view to using them for package freight if occasion presents itself.

The announcement that the Minnesota Steamship Co. will build no new vessels this winter, and will not lengthen any of their fleet of small steamers, is taken as evidence that the management of this corporation does not look for a boom in freights next season. The effect of deeper channels from Lake Superior next season has had considerable attention from the ore men, some of whom are of the opinion that an increase in ore shipments to 12,000,000 tons, will, if it comes, be largely taken care of by deeper draft. Agents of the Minnesota company had secured proposals with a view to building at least one big tow barge, and for lengthening one or two of their original steamers, but these plans were discarded at the annual meeting of the company, held in New York a few days ago.

No meeting of the American Steel Barge Co. to decide on the question of new vessels has been held as yet, although it has been said that a big steamer will be built at the West Superior yard. This opinion is probably correct, however, as the barge company will be enabled from its earnings on contract ore this season to pay big dividends and still have a surplus for some new work.

Measured the Cylinders.

Editor Marine Review:—It is amusing to note that in all the early discussion regarding the Say When—Enquirer yacht race no one had correct figures as to sizes of the Say When's engine cylinders. I understand that Mr. White finally ordered the engineer of the boat to take off the cylinder covers and settle the question. The diameters proved to be 14½, 16½ and three of 22½ inches.

It is said now that a new boiler will be placed in the Say When and that engines will be moved to the center of the hull, so that the shaft will be in line with the keel. In all the discussion I saw no reference to the relative merits of propellers, nor even their size mentioned, to say nothing of their design. At first the respective engines did all the work. Then the water tube boilers did it, and even the coal got its share of credit, but not a word was said about the propellers. When upwards of three hundred turns per minute are made, the exact way in which the blades of the propeller cut and leave the water that many times ought certainly to have some effect.

Detroit, Mich., Nov. 17, 1896.

F. I. Reman.

Capt. Alfred T. Mahan, U. S. N., who is known as one of the foremost writers of the world on naval topics, has been placed on the retired list of the navy at his own request, under the law permitting retirements after forty years' service. Capt. Mahan desires to devote his entire time to literary work.

The Review has excellent photographs of lake ships.



DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio,
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binders sent, post paid, \$1.00. Advertising rates on application.

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The books of the United States treasury department on June 30, 1895, contained the names of the 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.13
Sailing vessels	1,100	300,642.10
Unrigged	487	83,081.91
Total	3,342	1,241,459.14

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

* Year ending June 30, 1891.....	204	111,856.45
" " " 1892.....	169	45,968.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
Total	347	335,433.98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages.....	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered.....	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation.....	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ¼ per cent. of the whole, but largely in American vessels.

Some attention has been directed to the great Siberian railway through the plans of the Russian government for operating on Lake Baikal in Siberia, car ferries similar to those in use at the Straits of Mackinac. But as Lake Baikal is only a small spot on the map of Siberia, so also is the car ferry scheme only a drop in the bucket as compared with the Siberian project as a whole. The Trans-Siberian railway is the greatest undertaking in railway engineering known to history. Seventy thousand men are now at work on it and the lowest estimate of its cost is \$75,000,000. It is expected that through communication by means of railway and water will be accomplished by the end of 1900, and probably the entire scheme in another five or six years, when it will be possible to travel by rail the entire distance from the shores of the Sea of Japan to Calais. Shanghai will be brought within eighteen or twenty day's journey of Europe, instead of requiring forty-five days as at present by way of the Suez canal, while it is quite possible that a month will suffice to make the trip round the world. The influence of this railway on commercial conditions of Europe can not well be foretold. It will open up a country 4,700 miles long by 200 miles wide, from which already 200,000 tons of grain are exported annually to Russia. Timber from forests which cover an area of twice the size of France, will doubtless be floated up the rivers to the railway for export. Rivers in great numbers cross the railway route at right angles. Tea and silk will be brought from China at considerably less cost than at present. The gold mines at present produce metal to the value of \$20,000,000 per annum, and it is stated that the coal fields cover an extent of 30,000 square miles, and yet at present they are only worked in two small mines. When such great natural resources of the country are considered, and the facilities that will be afforded for cheaper transit of the traffic already existing, it will be granted that the effects of this gigantic project are difficult to estimate.

If the ocean carrying trade of the world is experiencing a boom that has given orders to British ship builders which are, in the aggregate, unprecedented in the annals of the industry, why should we not expect that a part of this prosperity will be reflected to general business in this country within the coming year. Ship building orders to the extent of about 300,000 tons have been reported in England and on the Clyde within the past month. Nearly all of the vessels ordered are cargo steamers of about 5,000 tons deadweight capacity. All of the ship building concerns now have in hand about a full

year's work. Prices on material for ships are about 12 per cent. higher than they were a month ago.

It is reported from Washington that, on account of uncertainties regarding finances previous to the Presidential election, the war department purposely delayed, in a great many cases, the matter of calling for bids on contracts for river and harbor work under the continuous contract system, aggregating about \$50,000,000, which was authorized at the last session of congress. The department was quite certain that the disposition among contractors would have been to demand higher prices or to refrain entirely from putting in bids. Now that money matters are settled, preparations for letting these contracts are being made as rapidly as possible, and the effect on the lakes, where a big share of this work is to be done, should be beneficial to business interests.

The report from Admiral Ramsey, chief of the bureau of navigation, navy department, showing that 72 per cent. of the enlisted men now in the navy are American citizens, and that more than 82 per cent. of the apprentice boys are of American birth, will be received as an agreeable surprise to everybody interested in the new navy. Only a short time ago the enlisted force in the navy was thought to be made up almost entirely of foreigners. England is now worried over the great number of foreigners on her ships. The change in this country has been brought about by better treatment afforded the men, and the navy department is to be congratulated especially on this account.

Erastus Wiman, Chauncy Dutton and Alex R. Smith are names associated with the "gigantic" canal boat combination, which is to take advantage of Erie canal improvements, and which is "just ready to be floated," with steam canal boats, storage ware houses, Niagara electric power, etc. These names, as well as others referred to as promoters of this scheme, have been heard of before in connection with big enterprises, but only in newspapers.

From a Water Tube Boiler Advocate.

Editor Marine Review:—I attended here on Thursday and Friday last the sessions of the Society of Naval Architects and Marine Engineers, and learned considerable about the operation of water tube boilers other than the Belleville installed lately in big ships. I am satisfied that other manufacturers are meeting with difficulties equally annoying as those which we encountered on the lakes. It is plain that with the short run of the heat products in water tube boilers, especially when grouped in number above four boilers, the consumption of the gases must be completed in the furnace itself, leaving the heat products to be absorbed by the heating surface above it, and this space never to be forced to become a combustion chamber, which results from thick fires and limited air supply. These are exactly the conditions which I intended should be prevented by fire room instructions made for the lake steamers North West and North Land. Thus with water tube boilers not behaving well anywhere, the tank boiler people, the sellers of tubes and the steel makers are, of course, jubilant, but you may rest assured that the water tube advocates are only in a temporary cloud, and bright skies are ahead for them. Work on the Belleville boilers in the British ships Powerful and Terrible make us on the lakes feel our position most keenly. Results with the boilers on these ships are amply sufficient to excuse indignant feelings on account of being forced to accept humiliation through the gross ignorance and conceited incompetency of those who could not prevent fires of 16 or 18 inches, as a rule, against the 6 inches demanded by instructions, and who also persisted in cleaning, in defiance of instructions, half the grate surface at a time. I have repeatedly referred to this matter of firing for the reason that it is the essential requisite to potential efficiency and economy, carrying with it all the other guiding rules for the management of the boilers.

Miers Coryell.

No. 21 East 21st street.

New York, Nov. 17, 1896.

Nearly one hundred different kinds of valves and other steam specialties are shown in a pocket-sized catalogue issued by the Lunkenheimer Co., Cincinnati, O., the company also having branches in London and New York. Engineers can have one sent them by sending their address. The book is interesting and valuable for reference.

Gold and Silver from a Depth of 28 Fathoms.

Up to a few years ago it was considered impracticable to conduct diving operations at a depth of more than 100 to 120 feet, but with improvements in the ordinary diving suits the depth at which extensive operations have been carried on during the past year has been increased to 28 fathoms, or 168 feet. English shipping journals give details of two important jobs conducted at this depth during the past summer. In 1891 the steamer *Skyro*, carrying eighty-eight bars of silver, valued at \$45,000 and stored in a spare berth in the cabin, sank in 28 fathoms of water off a reef near Cape Finisterre on the coast of Spain. Her hold contained 700 tons of pig lead, said to be worth \$70,000. She was two miles off shore in an exposed position. I. K. Moffatt, an English engineer residing in Bilbao, Spain, attempted to secure the silver during the summer of 1895, but the diving apparatus which he had at hand was not of the best. One diver was severely punished by over pressure, and a second one, from the same cause, went mad, but afterward recovered his reason. Operations were suspended until July 15 of last year, when powerful diving apparatus had been received from Messrs. Siebe, Gorman & Co. of London, and a new diver named Angel Erostarbe had been engaged. In beginning operations a strong iron buoy was moored to the sunken vessel, for the double purpose of marking the wreck and as a means of giving the diver a correct line to go to and come from his work at the bottom. Between the above date and Sept. 3, the diver descended forty-four times and recovered fifty-nine bars of silver, the average time of each dive being thirteen minutes. Once he stopped down for forty minutes, but upon coming to the surface he was taken suddenly ill and his flesh became very much discolored. His injuries were not serious, however, as he was at work again four days later. The air pressure at 28 fathoms was 72 pounds, and a man of great stamina was of course required to work under such pressure. While the diving operations were under way there were four men at the pump handles, who were relieved every five minutes, consequently it took eight men to tend the air pump and two men to assist the diver. The air pipe was tested, before beginning, to 120 pounds per square inch. The diver's dress itself would probably not stand 20 pounds actual pressure.

Shortly after beginning the work, and when thirty-four bars of silver had been secured, it was found necessary to blow up the quarter deck in order to get at the remainder of the treasure, as the upper deck, by pressure, had been forced down to within 18 inches of the cabin deck where the silver lay. The dynamite charge was successfully fired by electricity, upon the fifth trial. After the charge was fired, great quantities of large fish floated to the surface of the sea, many of which weighed over twenty pounds each. Nearly a ton of these stunned fish were captured and given to the villagers. Curious to relate, when the charge was fired from a small boat moored right above the wreck, no shock was felt by the men in her, whilst those on board several small steamers, which had been removed some distance away from the wreck, felt a distinct shock. Nothing further was observed, with the exception of a quantity of air bubbles that came to the surface ten minutes after the explosion. On the diver going down, he found the water so thick and disturbed that he could see nothing and was forced to suspend operations temporarily. On the next descent he found that the dynamite had removed part of the upper deck, and he succeeded, in three dives, in sending up twenty-two bars of silver valued at \$11,000, a splendid day's work. Bad weather then caused operations to be suspended for the year. All but twenty-nine bars of the silver was recovered. Next year three divers will attempt to bring up also a large part of the pig lead. When it is taken into consideration that this treasure has lain sunken for five and a half years on an open coast in 28 fathoms of water, with a strong current, and in face of the full force of all the great Atlantic storms, the difficulties of the undertaking will be appreciated. The current was so strong that the diver was frequently swept away from his work. In such a case he had always to come to the surface, as he could not return to the cabin against it. He always went down and came up by the buoy-line.

The diver, a Spaniard, is described as a man of splendid physique—just the very man for such an undertaking. He carried with him, when diving, a large knife, and a hatchet to defend himself against sharks and octopuses, if required. Some time ago, whilst he was diving for the harbor authorities at Bilbao, the crane chain broke, and a large stone came down on his leg, and pinned him to the bottom under water. There he remained for five hours till liberated

by another diver. On another occasion, in coming up, he fouled his air pipe with a cork float attached to the buoy rope, 50 feet below the surface. Having a good upward impetus, he was capsized—turned head downwards—and his head slipped out of the helmet below the breast plate. He could neither right himself nor replace his head. However, working with his hands in this reversed position, he freed his air pipe and shot up to the surface feet foremost. His assistant recapsized him and he was no worse for the mishap. He never lost his presence of mind. As a last resource, he thought of cutting his air pipe, but he found he was unable to reach his knife, being too far down in the dress.

Another job, similar to the one just described, is reported from New South Wales. When the steamer *Catterthun*, bound from China to Sydney, struck the Seal rock and sunk in thirty fathoms, the possibility of recovering any of her specie seemed very remote. Still she had \$50,000 on board, and the prize was a tempting one. After a long search the vessel was found and two divers, named May and Briggs, set to work. They had to work at a depth of 27 fathoms, in a current running from 1½ to 3 knots on the surface, and even stronger on the bottom. To prevent themselves being washed away, they had to fasten themselves to a line attached to the deck of the wreck. They could remain below only eleven minutes at a time, making five dives a day. They blew a hole in the treasure room with dynamite, but as the opening was too small for them to enter in safety, they improvised long grippers to drag the boxes within reach, where they were placed in a net and drawn to the surface. After three months' work, interrupted from time to time by heavy weather, they recovered, on Aug. 17 last, the first box containing \$25,000 worth of gold. On the 20th, other boxes, containing in all \$15,000, were brought up, and, as the wreck showed signs of breaking up, the rest was abandoned. Of the \$40,000 recovered, the two divers received \$7,500 apiece for their share of the work.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Nov. 14, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago	15,571,000	5,670,000
Duluth	4,994,000	2,000
Milwaukee	415,000	47,000
Detroit	430,000	37,000
Toledo	775,000	194,000
Buffalo	1,902,000	1,004,000
Total	24,087,000	6,954,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 1,104,000 bushels of wheat and 167,000 bushels of corn.

The Buffalo Forge Co., Buffalo, N. Y., recently received an order for an apparatus to be used for what is probably the largest glue dryer in the world. It involves the use of three steel plate fans, 170 inches tall, having inlets 79 inches in diameter and outlets 63½ by 70 inches wide. The wheels inside the fan casings are 120 inches diameter by 66½ inches wide at periphery. Each of these fans is driven by a 12 by 14-inch horizontal self-contained center-crank engine of the Buffalo company's make. Each of the fans will deliver at its outlet 150,000 cubic feet of air per minute, at 1 ounce pressure. Each fan is to be supplied with a heater of appropriate size. When it is taken into consideration that the combined capacity of these fans is 450,000 cubic feet of air per minute, it may at once be seen that this glue dryer is the largest one ever erected. The outfit will be installed into the works of Delaney & Co., Philadelphia, under the specifications of Francis Bros. & Jellet, a well-known engineering firm of the same place.

Bids for the following work will be opened in the office of the United States engineer at Milwaukee at 12 o'clock noon on Nov. 27: Kewaunee harbor, 425 feet pile pier extension; Mantiowoc harbor, 500 feet crib pier extension; South Milwaukee harbor, 180 feet pile pier extension; Racine harbor, 250 feet crib pier extension; Kenosha harbor, 250 feet crib pier extension.

The Review has excellent photographs of lake ships.

Lake and Canal Commerce.

Lewis Nixon of Elizabethport, N. J., who built last winter a fleet of thirteen steel canal boats (three steamers and ten consorts) for the Cleveland Steel Canal Boat Co., read a paper on "Steel Canal Boats" at the meeting of the Society of Naval Architects and Marine Engineers, held in New York last week. Mr. Nixon could not, of course, find much to say about these canal barges from a ship builder's point of view, but it was made interesting by a discussion of the New York state canal question, in which he displays a clear knowledge of conditions that have almost destroyed the efficiency of the Erie canal. He warns New York city of disastrous results which he says will follow its neglect in the matter of terminal facilities for canal business, and points out the disadvantages under which canal boat owners are now working on account of lack of organization. He says:

"The effect of the Erie canal is more far-reaching than serving as a carrier for interstate products; for, on account of the low freight rates possible, it is a most potential factor in a possible profit to the producer, the manufacturer and the exporter of food products. The minimum rates of transportation afforded by the canal will alone enable these three classes to compete in the markets of the world with other nations. Yet the Erie canal has in no sense fulfilled its mission, and while it should be contributing to the cheapness of food, out of 11,000,000 barrels of flour arriving in Buffalo last year, less than one thousand were carried east by canal. This is due to a hopeless lack of organization among the canal men themselves. They compete with one another for business arising along the canal, and like a lot of insistent cabmen at a station, repel rather than attract a possible fare. With no regular terminals, with no connections with points of origin of freight, with no arrangement for through bills of lading, immediately available to the shippers for banking purposes, we see this canal, with all its great potentiality of profit, possible economy of operation, freedom from interest charges and port exactions, from which the railroads cannot escape, giving up to the five trunk lines between Buffalo and New York nearly the entire business of moving flour, provisions and grain from the west for export to the great consuming districts of the east, and the movements of merchandise from New England to the west. While the debt which the interior of our country owes to the railroads is beyond calculation, the cost of carrying products by rail over such distances eliminates all chances of profit at the farm. The expensive equipment and great first cost of railways means that the freight charges must be regulated by the necessity for paying the interest on the bonds issued for such constructions. Expansion of capitalization, and worst of all excessive competition, followed by consequent combination, bring about a rate destructive of profit to the producer. Piled upon this are the transfer tribute demanded at Buffalo, and the excessive lighterage charges in New York. Of the \$20 paid for bringing a car load from Buffalo to New York, as much as \$18 of it has been paid for lighterage by the railroad. Canal traffic does away with lighterage; the freight arrives already lightered. The railroads discriminate against package freight, so that the millers of the northwest pay about three times as much per mile for transporting flour as is charged for sending wheat to the mills of England, Holland and France, where it is ground to compete on the spot with American-made flour, with the result that our millers must fail in their effort to make flour for export profitable. An all-water route with no fixed charges, and using the cheapest form of equipment against five lines whose aggregate interest-bearing cost is not less than half a million dollars a mile, possesses advantages not necessary to explain. The movement of food products from Buffalo to New York by rail, and the subsequent shipment to New England and Europe, is one that if followed on the same lines much longer will prove disastrous to New York city, and reduce this great city to a second-class port. New York, unlike Philadelphia, Boston, Baltimore, Norfolk and Newport News, can not hold out the inducements of free storage, immediate access to ship's side and minimum port charges. The present conditions of freight handling are the worst that could be devised, even if plotted by an enemy."

The statement that the Lake Michigan Car Ferry Transportation Co.'s tug S. M. Fisher is to be lengthened during the winter is denied by the general manager of the company, who says the boat is a great puller and entirely satisfactory. He adds that if any change was to be made in her the Craig Ship Building Co., her builders, would be consulted.

Seven Government Ships.

The United States light-house board and the revenue cutter service are preparing plans for seven steel vessels on all of which lake ship builders will have an opportunity to submit bids. Two of these vessels will certainly be built on the lakes, as they are revenue cutters intended for lake service, but the five boats for which the light-house board is preparing plans—three light-ships and two light-house tenders—are for the coast, and it is doubtful whether there will be any great effort made by lake builders to secure these contracts. The experience of the Globe Iron Works Co. with the revenue cutter Gresham, as well as that of other lake builders with government work of a similar nature, has been such as to cause the builders to fight shy of these contracts when they can keep their plants going on new merchant vessels. Officers of these bureaus in the treasury department are fully as exacting as the navy in their methods, and the ship builder who does not figure on slow progress of work and stringent requirements in matters of the smallest detail is very liable to be out of pocket on any contract that he may make with them. A letter from Washington regarding the two new revenue cutters says:

"Both of the revenue cutters for which appropriations were made by the last congress are intended for service on the great lakes. They will be of the same size as the Gresham, at present building by the Globe Iron Works Co., Cleveland. While the hulls will be of entirely different design, the machinery of each will be practically duplicates of that built for the Gresham. From present progress on the plans and specifications, the contract for these two vessels will probably be awarded in the early part of January. During the last session, the senate passed bills providing for new cutters at San Francisco, New York and Mobile, and in all probability these bills will pass the house during the approaching short session."

The revenue cutter Gresham, referred to in the foregoing paragraph, had a dock trial of machinery at the works of the Globe company a few days ago. She will be a very fast vessel, and her official trial is looked to with considerable interest.

Plans of the five boats that are to be built for the light-house service are well advanced and specifications may be looked for almost any day now. These light-ships and light-house tenders are not, of course, costly vessels, but the contracts as a whole will involve about \$400,000 worth of work. One of the light vessels will be located on Diamond shoals, Cape Hatteras; another at Fire Island, N. Y., and the third at San Francisco bar. One of the tenders will be put into service in the second district with headquarters at Boston, and the other will have headquarters at Key West, Fla. For each of the light-vessels \$80,000 is appropriated, and \$75,000 each for the tenders.

Around the Lakes.

On Nov. 8 shipments of ore from Ashland aggregated 1,506,952 gross tons, of which 871,531 tons was moved over the Central railway and 635,421 tons over the Northwestern.

Capt. Geo. W. King, aged sixty-six years, died at his home in West Bay City, Saturday. He had lived in West Bay City for about forty-five years and was during all of this long period interested in tugs and lumber vessels.

First reports from Sturgeon bay regarding the condition of the wrecked steamer Australasia are said to have misrepresented matters. It is now claimed that the boat's boilers and machinery will be saved, and that it may be possible to float the hull, which is in good shape with the exception of a part of the stern.

At Frankfort, Mich., toward the close of last week, the tug E.D. Holton broke a wheel which she had swung ever since her launch at Milwaukee in 1874, twenty-two years ago. The wheel was one of the old style Sheriffs make, and because it had too much lead to suit them the Milwaukee tug captains tried in every way possible to break it, but never succeeded. Another Sheriffs wheel has been ordered and will be shipped in a day or two.—Milwaukee Evening Wisconsin.

As had been expected all along, Capt. James Reed has suspended operations on the Cayuga, sunk in the Straits, without having gotten along far enough to attempt to lift her. But he says he will go to work again next spring, and it is more than probable that he will stay with the vessel until he gets her. This is a characteristic of Reed, however little he may have made on wrecking operations of this kind. He now claims that with four pontoons sunk and fastened to the vessel, which will be allowed to remain in the water during the winter, he can raise the wreck in five days of favorable weather next spring.

IF YOU HAVE MONEY TO BURN

You can burn it in the boilers of your steamers without knowing it until the fuel bills come in. If not you will be interested in

AN INVESTMENT THAT PAYS 20 PER CENT.

Take all your fuel bills for the season and add up the amounts. If you have a modern steamer divide the total by 5, and the result will be

THE AMOUNT OF MONEY YOU "BURNED" THIS SEASON,

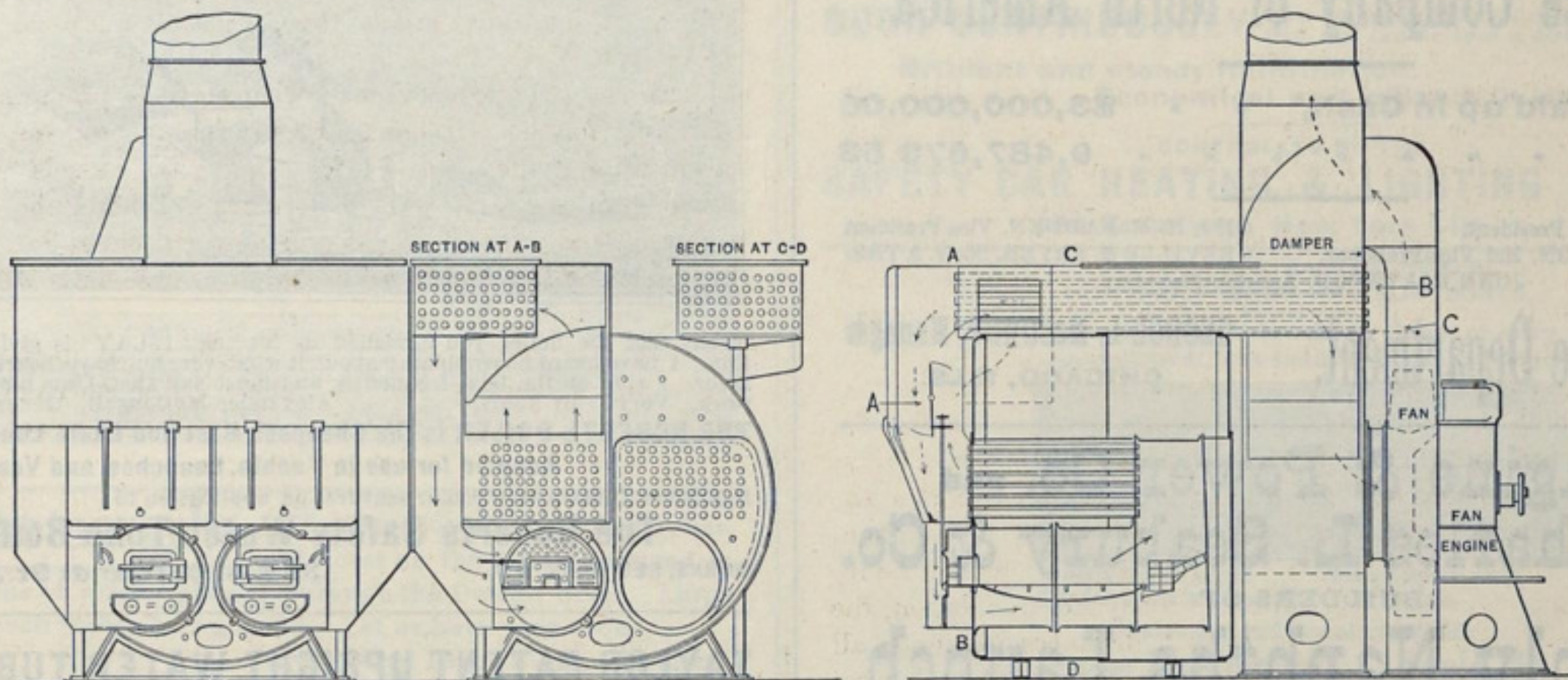
And the amount you can save next season by having your steamer equipped with the

ELLIS & EAVES SYSTEM OF DRAFT.

If you are interested in reducing the fuel consumption of your steamer to the lowest possible point, divide the total of the season's fuel bills by 3, and after looking at the result figure how much you can afford to pay to have your boilers retubed with

SERVE RIBBED TUBES

In addition to having the Ellis & Eaves system of draft. The draft will save 20 per cent. of the fuel and the tubes from 10 to 15 per cent. additional.

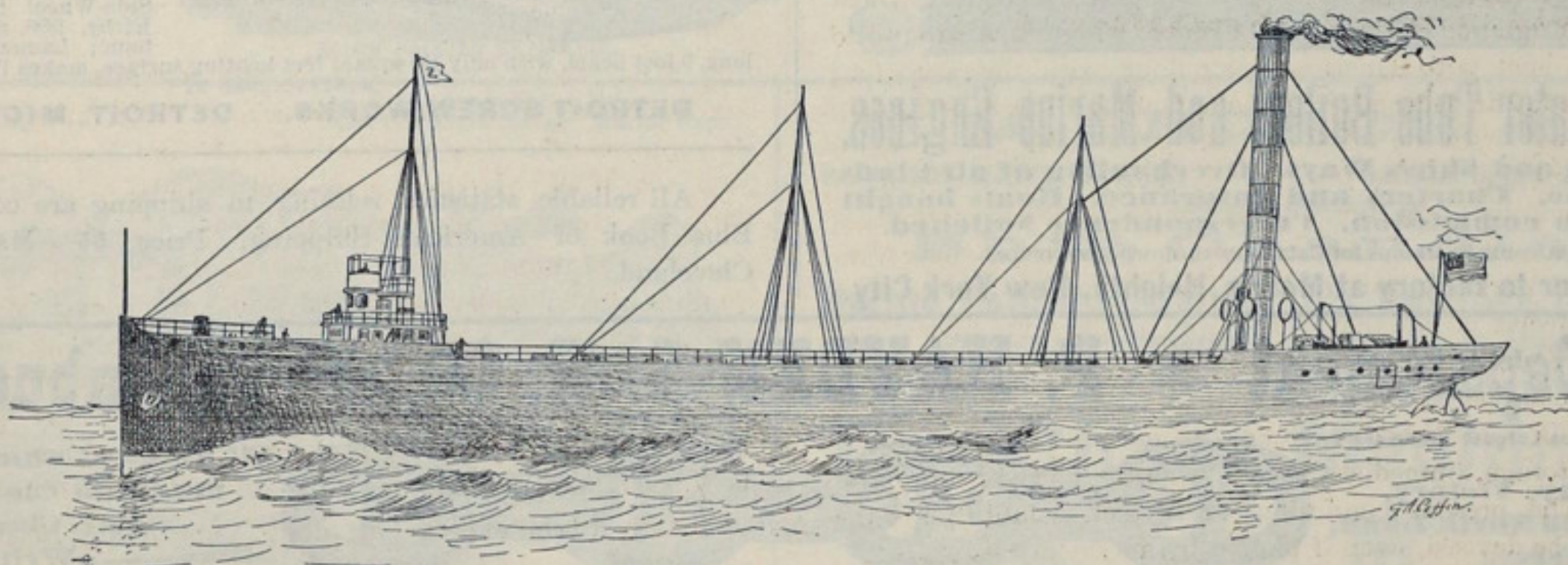
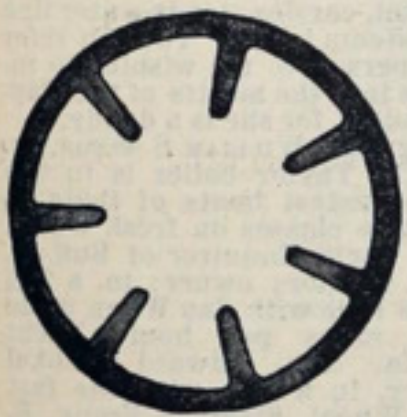


IF YOU ARE SKEPTICAL

You can refer to a table on pages 196-97 BLUE BOOK OF AMERICAN SHIPPING, which gives the coal consumption of ten modern lake steamers an average of **2.22** pounds per horse power per hour.

THE TEST OF THE STEAMER L. C. WALDO,

See MARINE REVIEW Oct. 22, fitted with the ELLIS & EAVES DRAFT, shows a consumption of **1.79** pounds—a saving of **20** per cent. with plain tubes. With SERVE TUBES and subtracting for auxiliary machinery, this can be reduced to **1.5** pounds, a saving of **33 1/3** per cent. The simplicity of this system of draft and the construction of the tubes will commend themselves to the most practical ship owners, builders and engineers, when it is known that it consists merely in making the natural draft stronger—not forcing but inducing it.



STACKS 200 OR 300 FEET HIGH.

Would give somewhat similar results. The SERVE TUBE is even more simple. SEE THOSE RIBS—they present 70 per cent. more heating surface than plain tubes. Smoke is unconsumed carbon, the essence of the coal. Watch the smoke stack of your steamer.

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15 TUGS AT CHICAGO,
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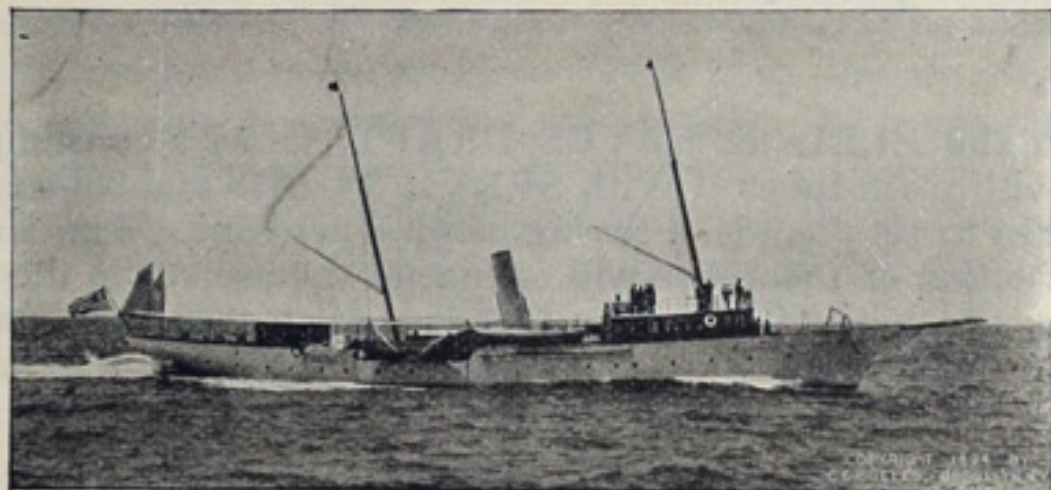
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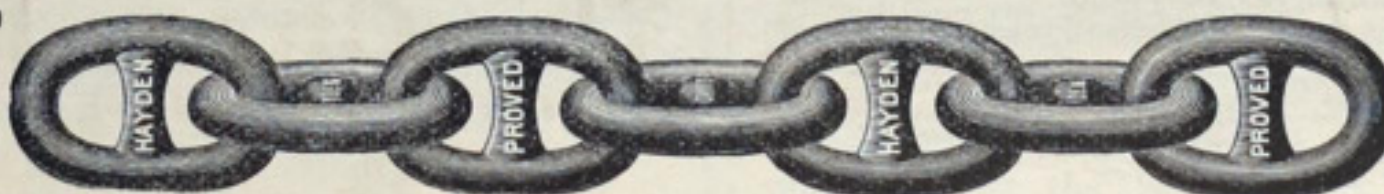
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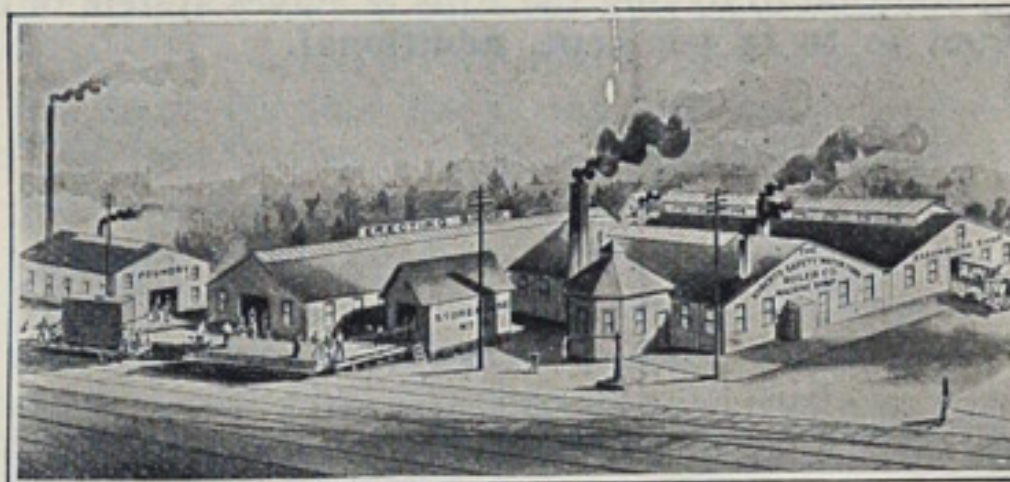
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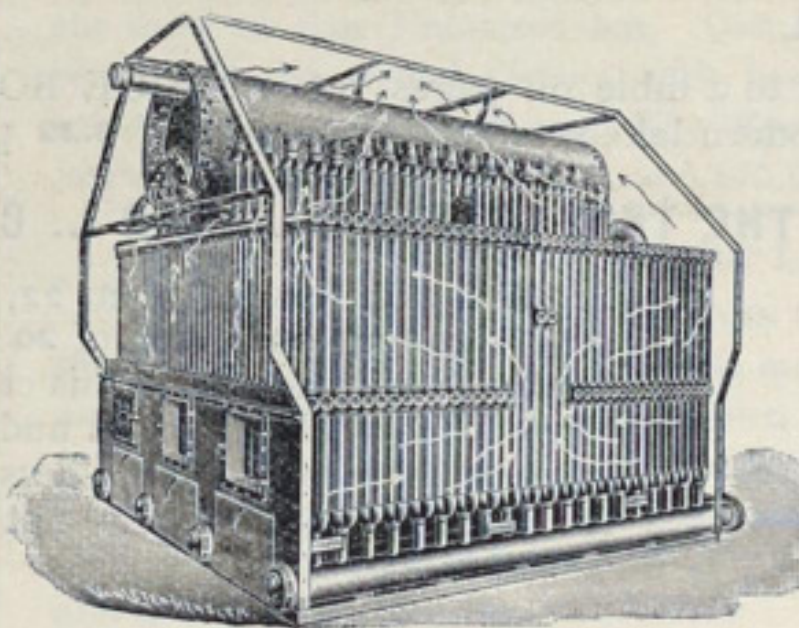
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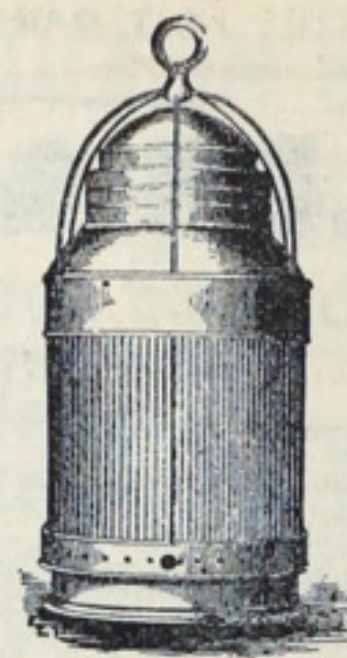


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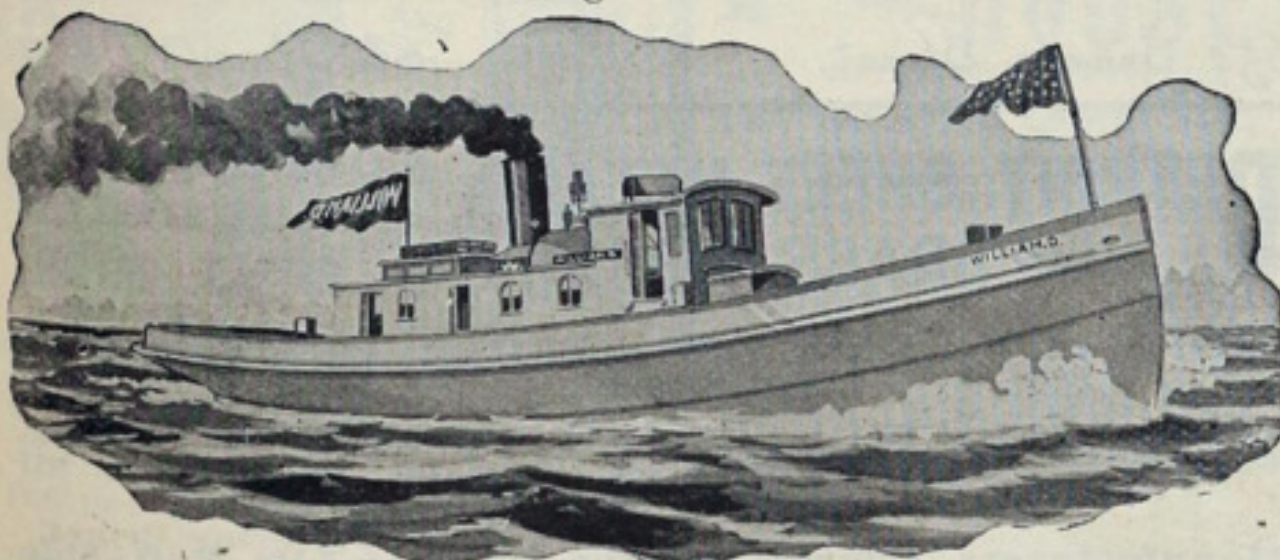
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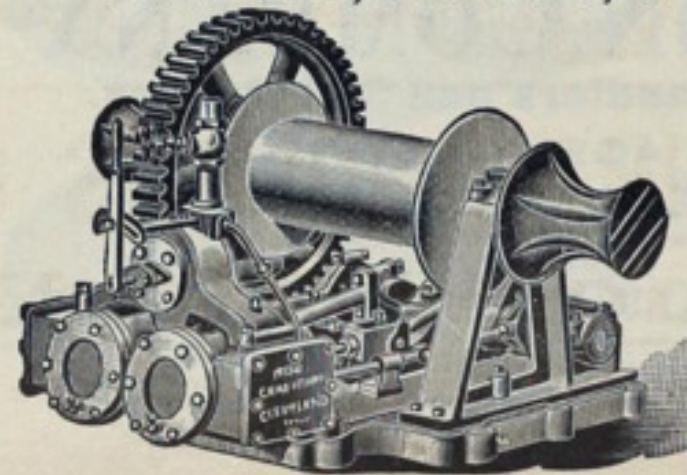
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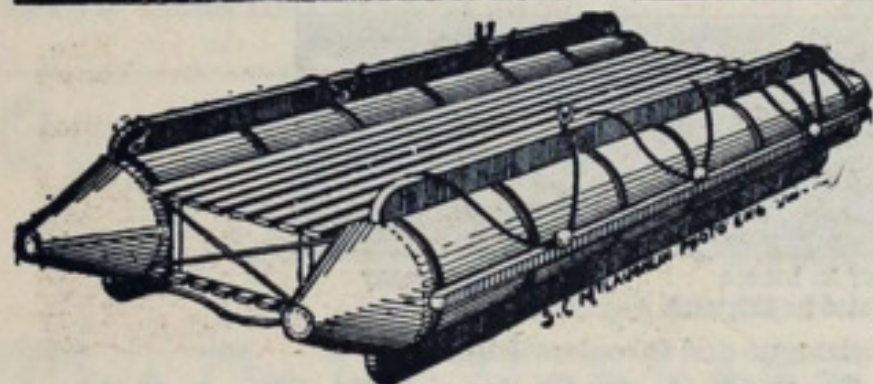
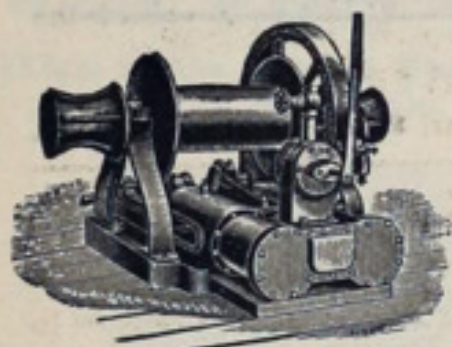
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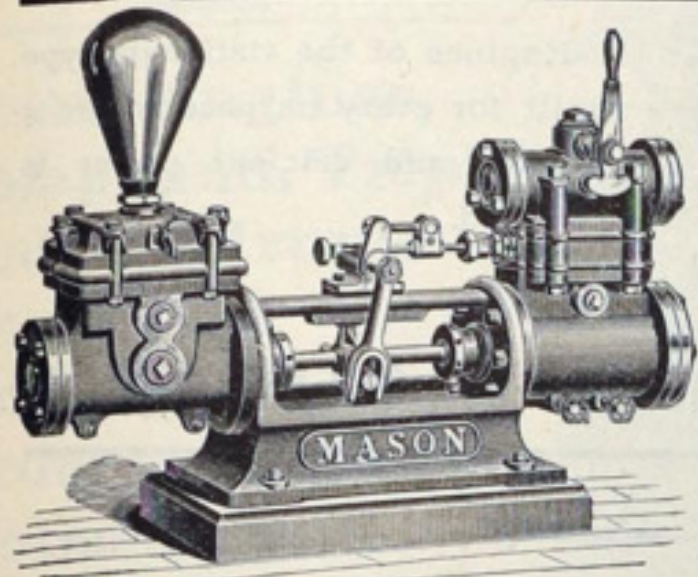
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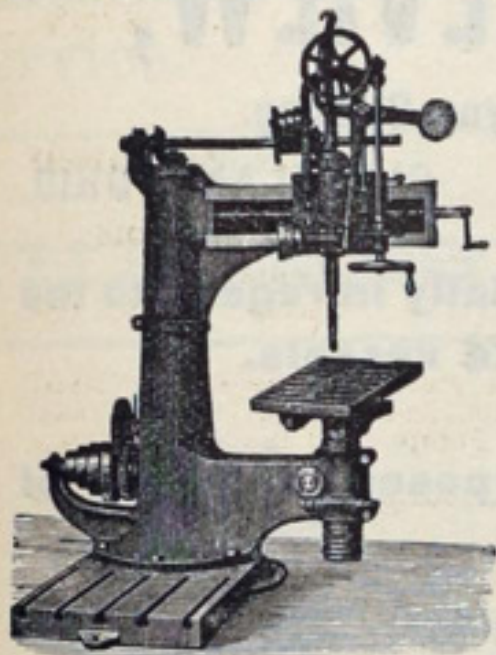
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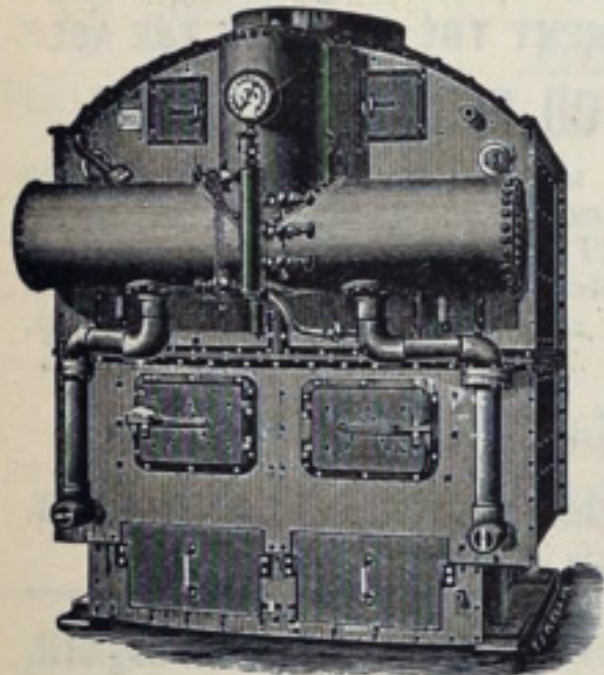
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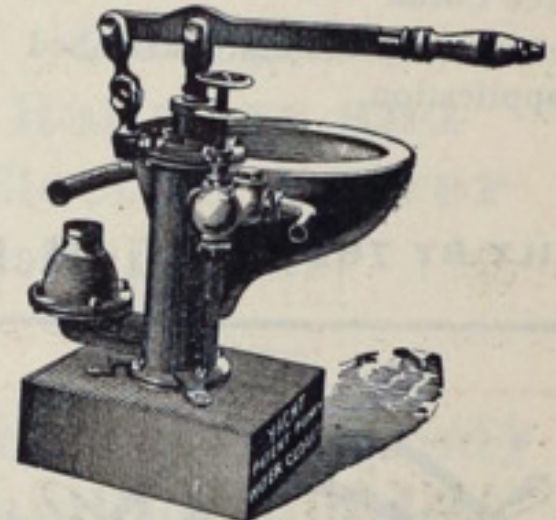
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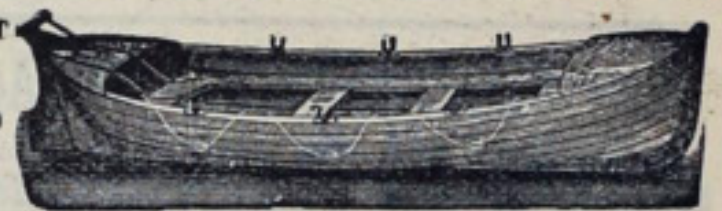
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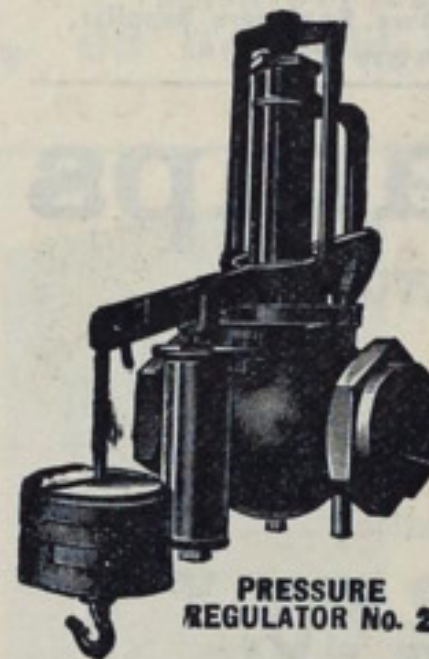
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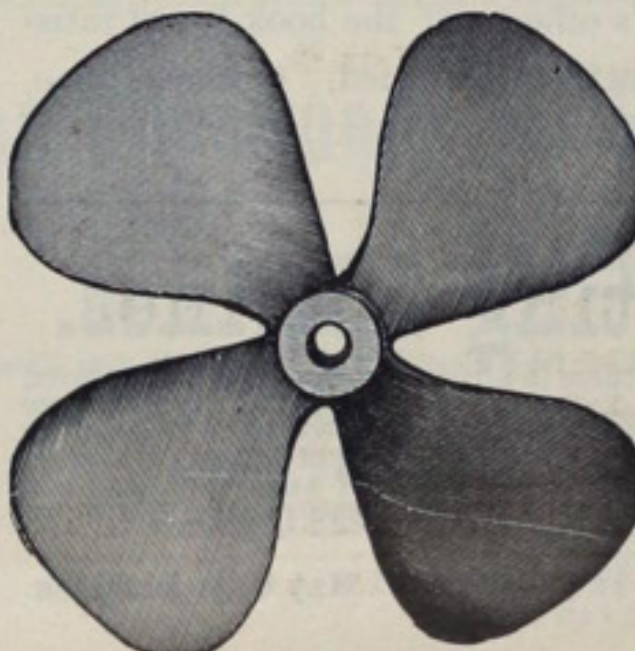
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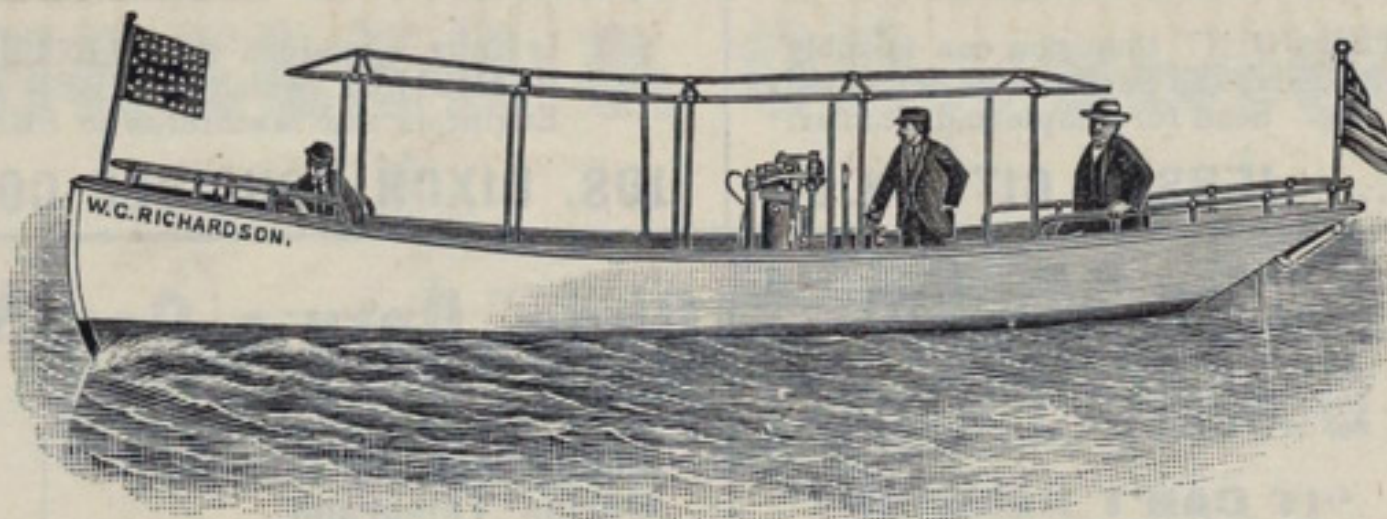
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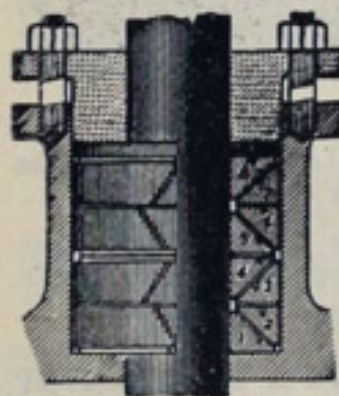
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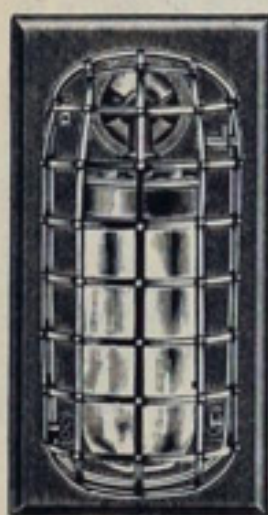
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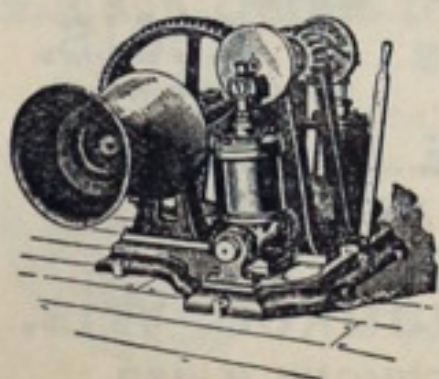
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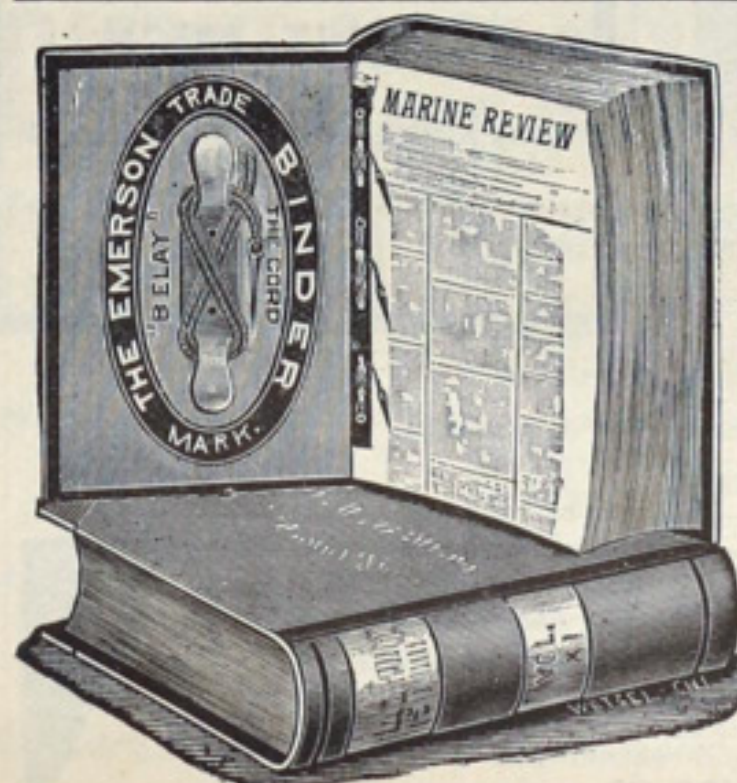


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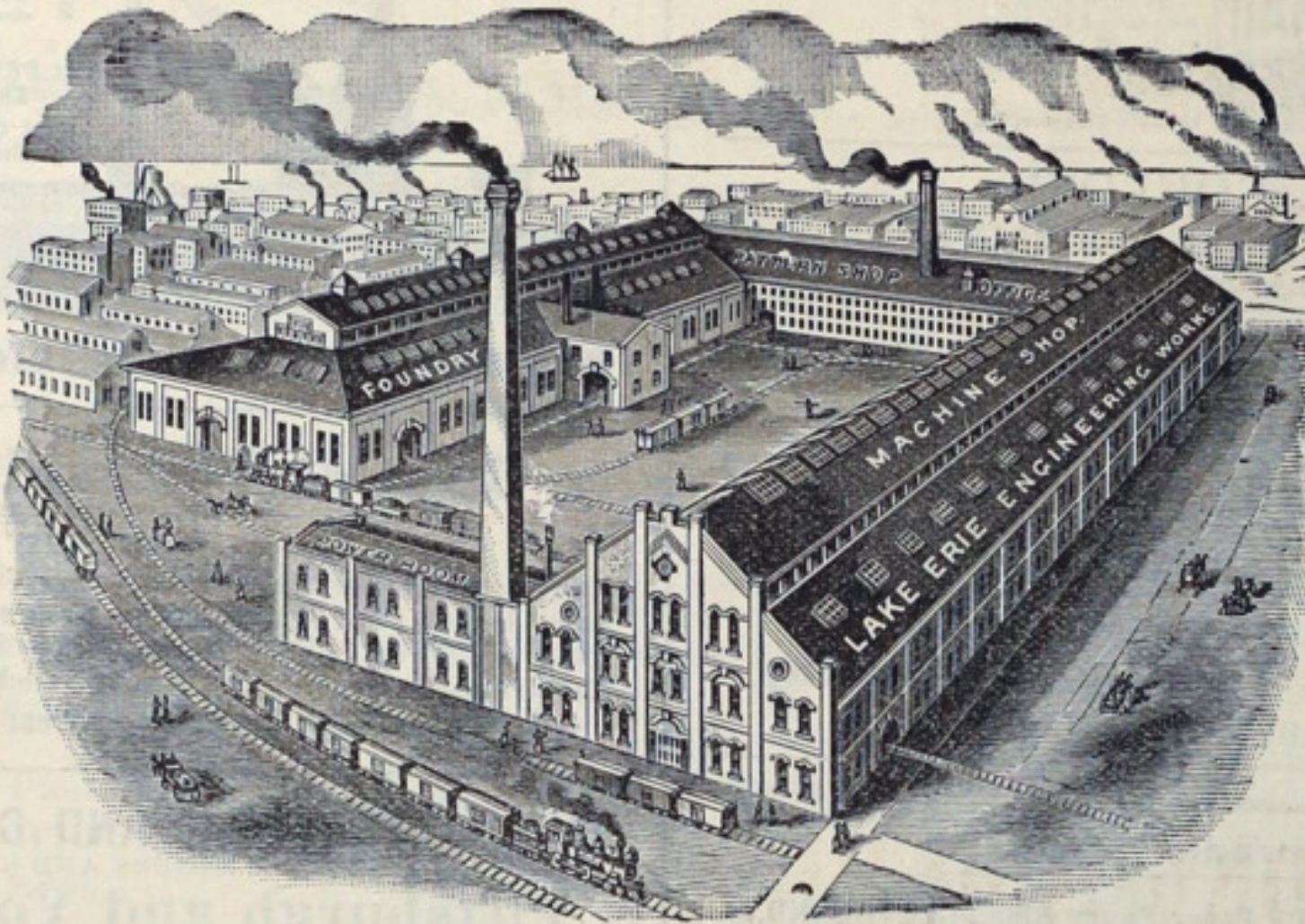
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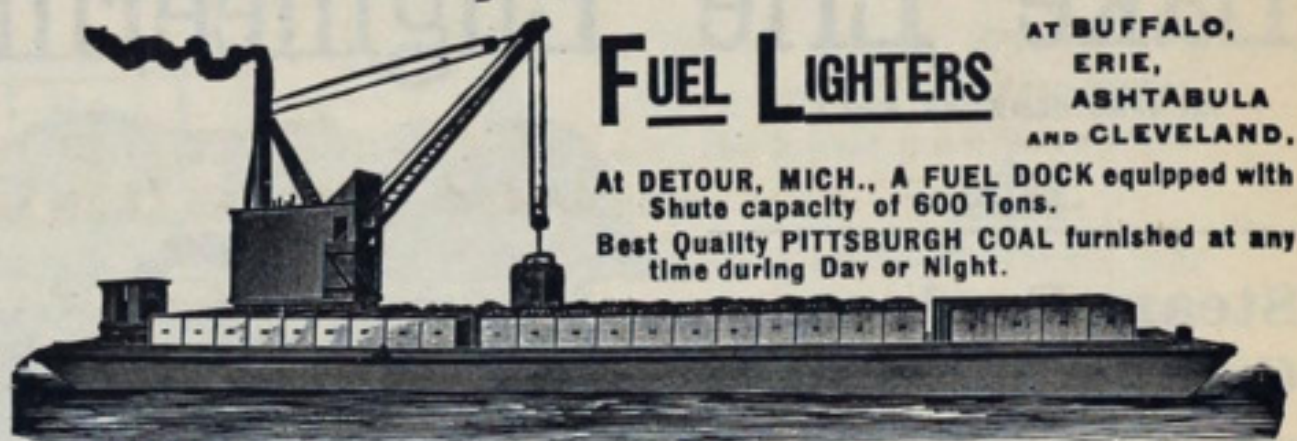
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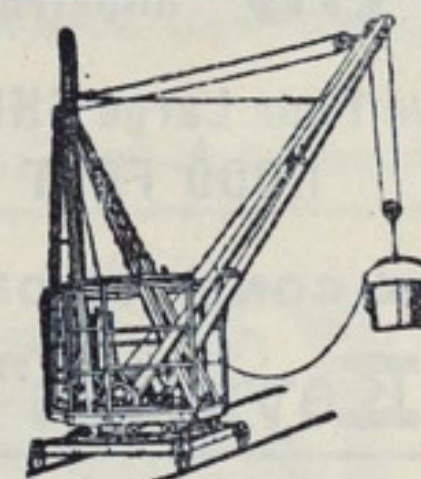
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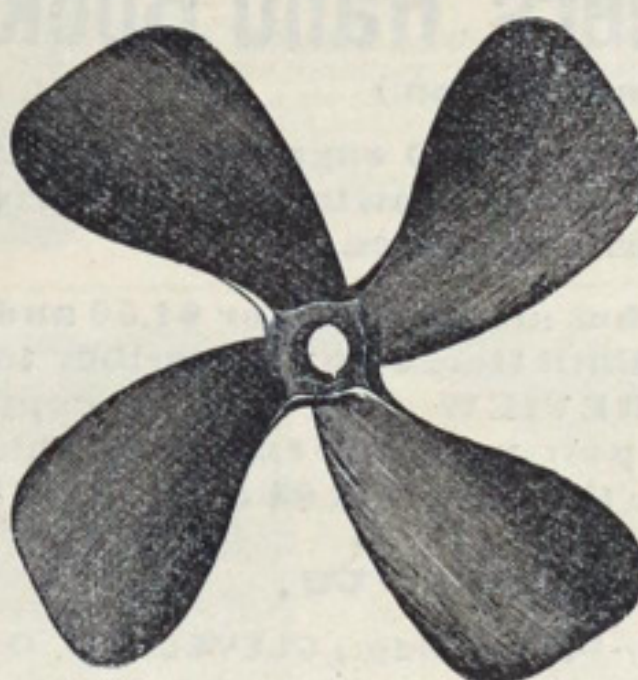


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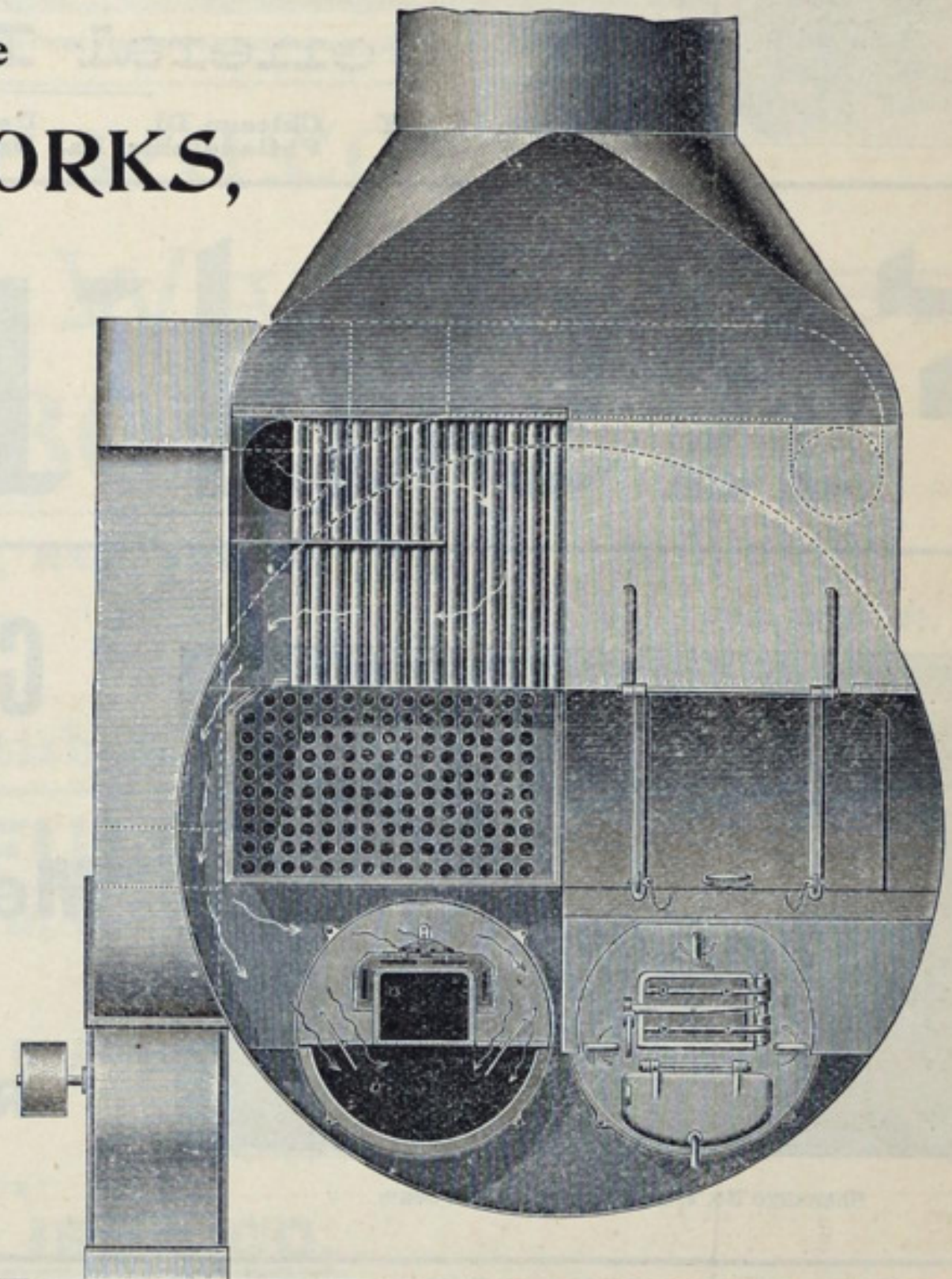
HOWDEN HOT DRAFT SYSTEM

As Applied to Marine Boilers by the
DRY DOCK ENGINE WORKS,
 DETROIT, MICHIGAN.

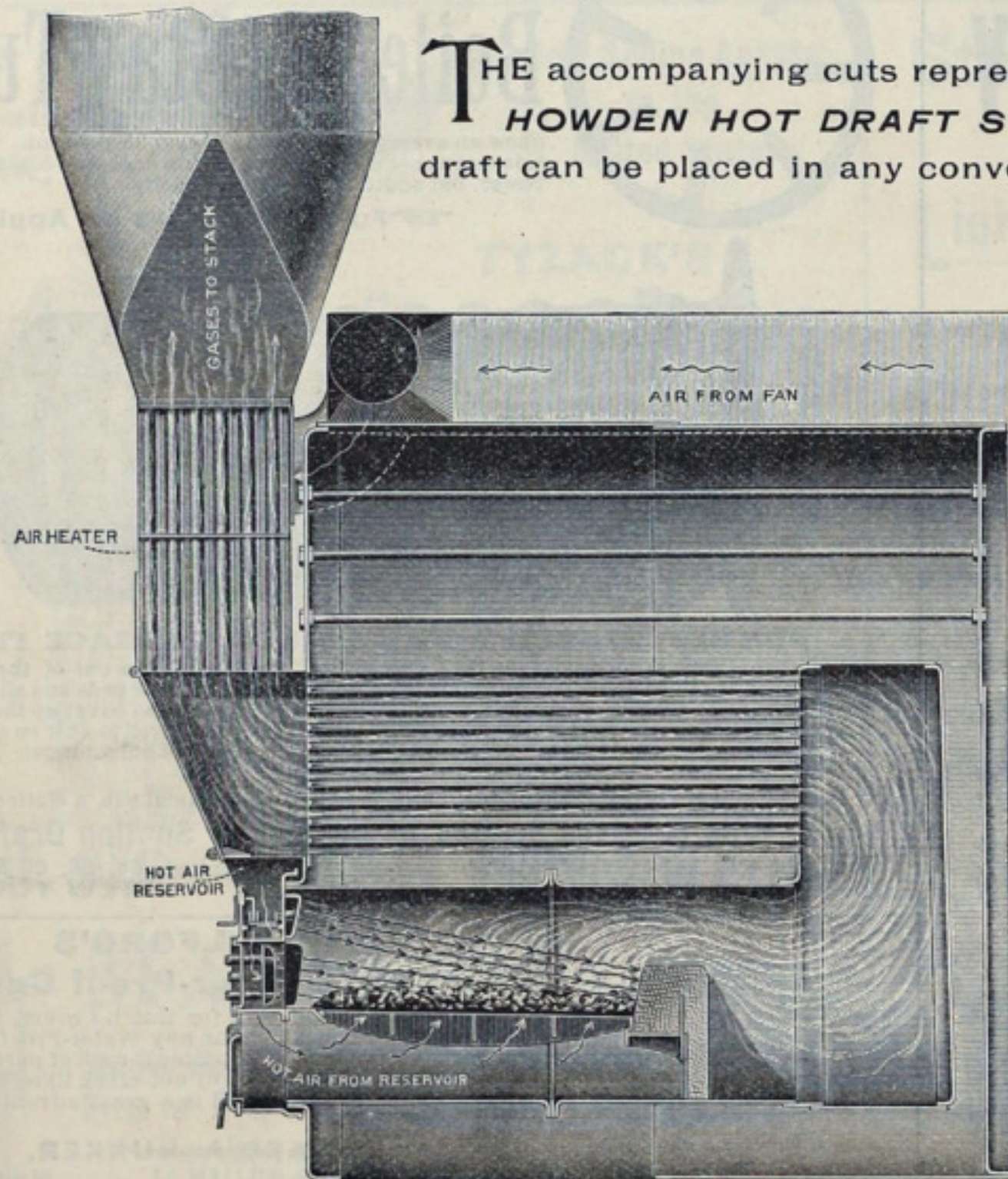
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The Howden system has a total installation in all parts of the world of 1,212,800 horse power.



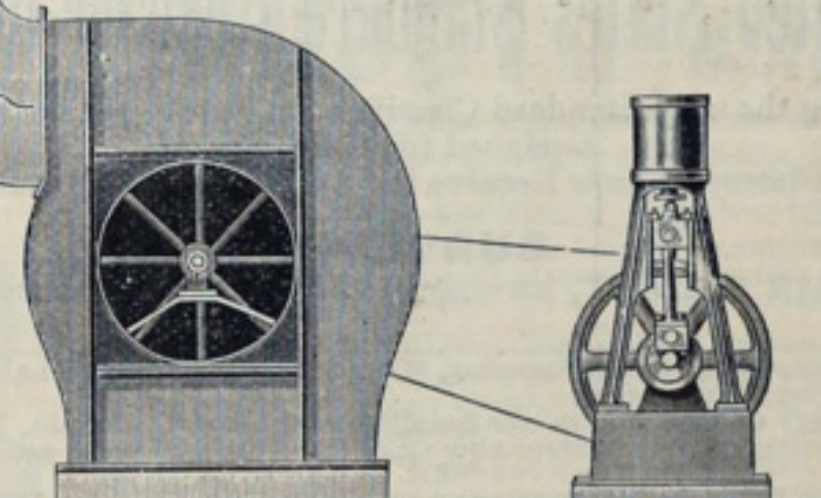
COVERING REMOVED—VIEW COMPLETE.

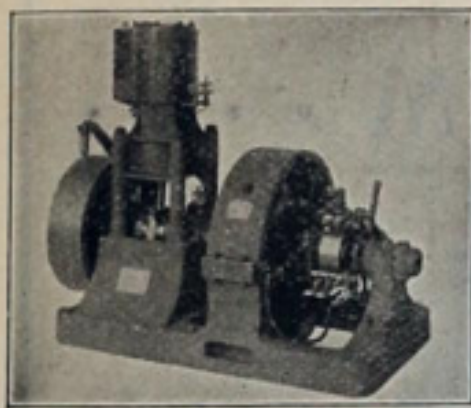


SECTIONAL VIEW.

THE accompanying cuts represent sections of a single boiler equipped with the **HOWDEN HOT DRAFT SYSTEM**. The engine and blower for supplying draft can be placed in any convenient place, preferably in the engine room. The

hot air from engine room is taken in and forced through the air duct to air heater, where it is heated by passing among vertical tubes, through which the escaping gases from the boiler pass. The heated air is led down in ducts around breeching and delivered under and over grates in sufficient quantities to get perfect combustion. The arrows in accompanying views illustrate the passage of air from blower. This is in general the principle of the **HOWDEN SYSTEM**.





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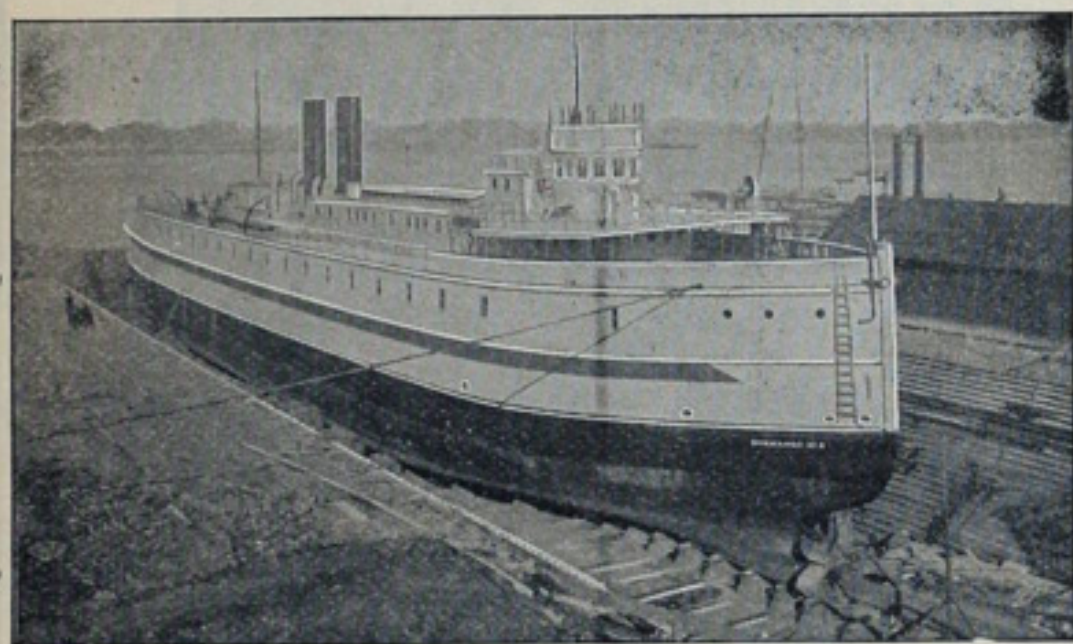
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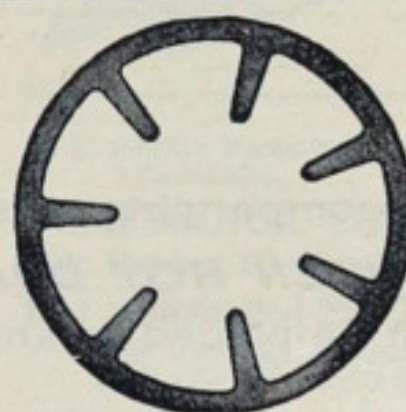
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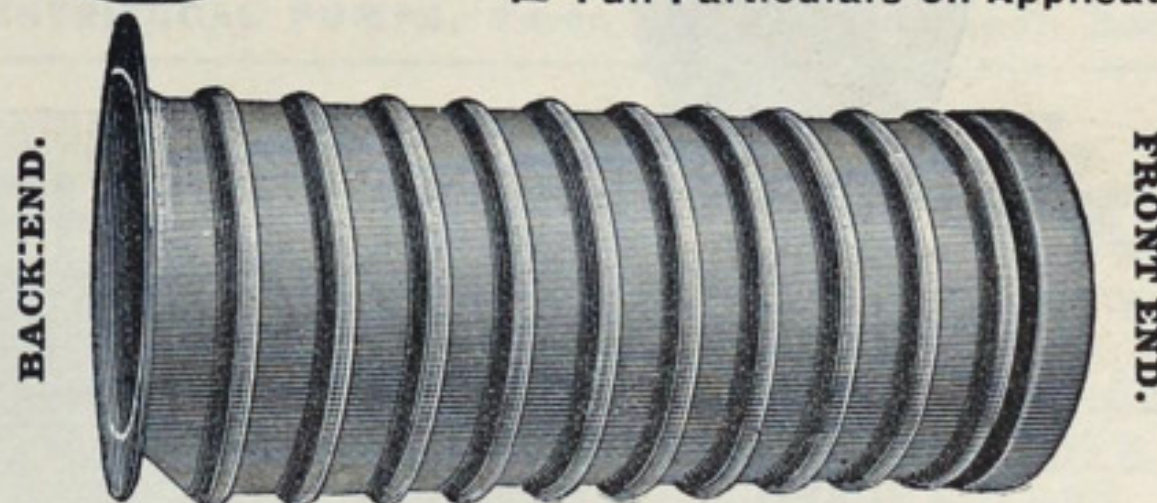
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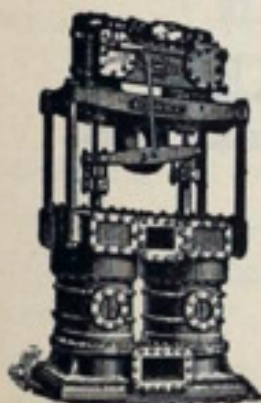
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366 Milwaukee St., Milwaukee, Wis., Oct.
27, 1896. Sealed proposals for: Kewaunee Har-
bor, Wis., 425 feet pile pier extension; Manitow-
oc Harbor, Wis., 500 feet crib pier extension;
South Milwaukee Harbor, Wis., 180 feet pile
pier extension; Racine Harbor, Wis., 250 feet
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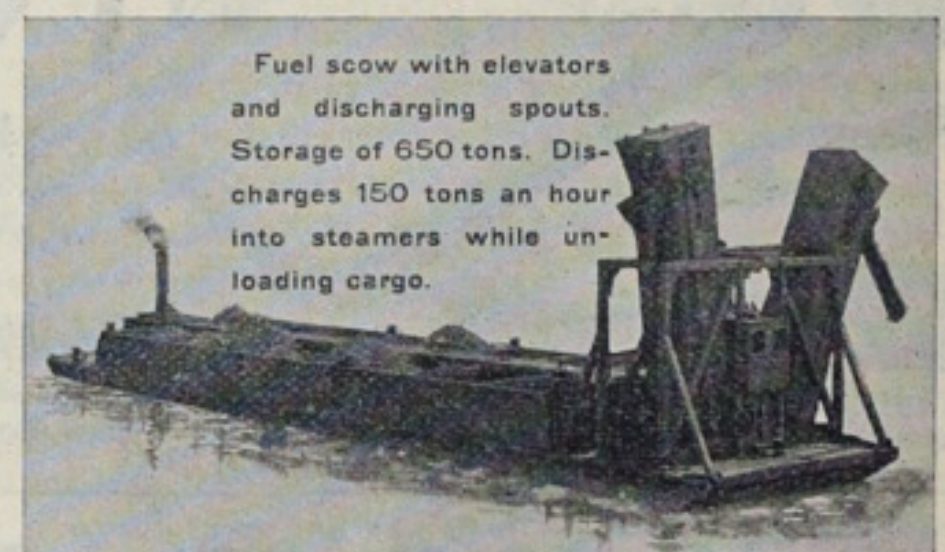
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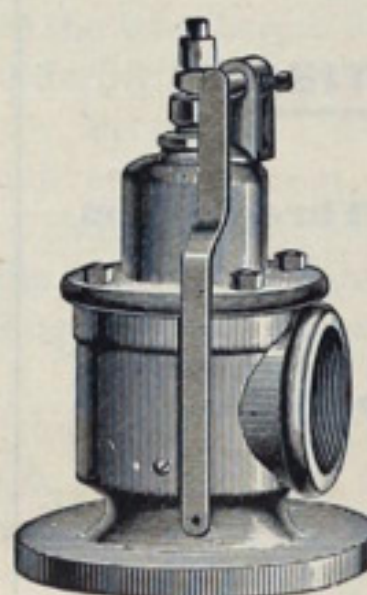
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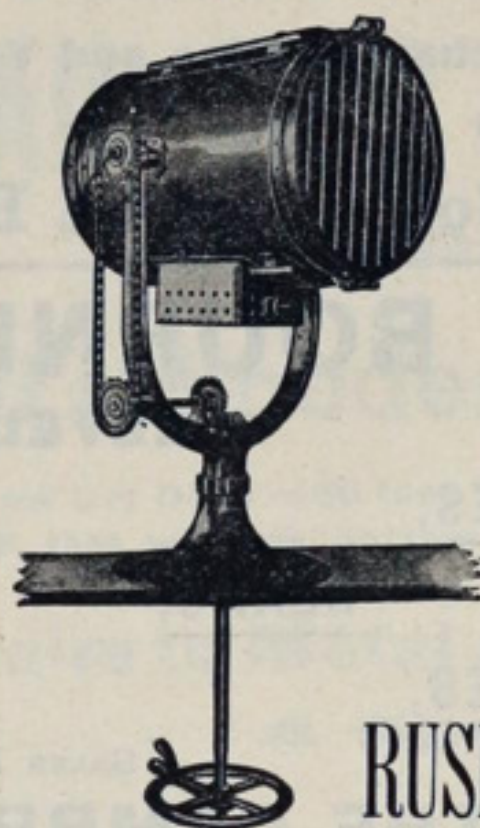
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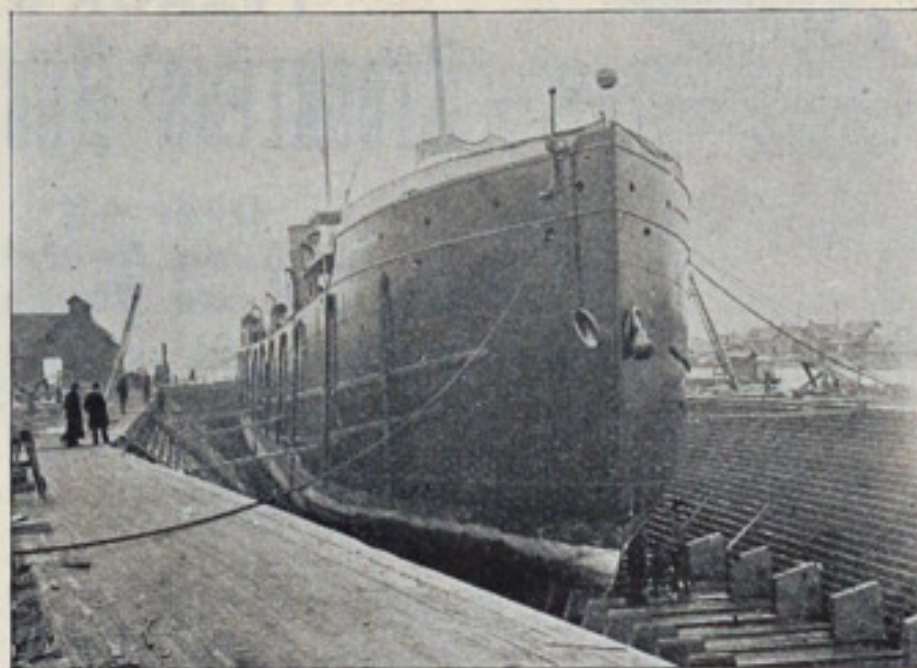
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